JUMBO-Giant Stunt Model; Radio Control; Foreign Notes

MODEL AIRPLANE NEWS

APRIL 1956 — 35 CENTS

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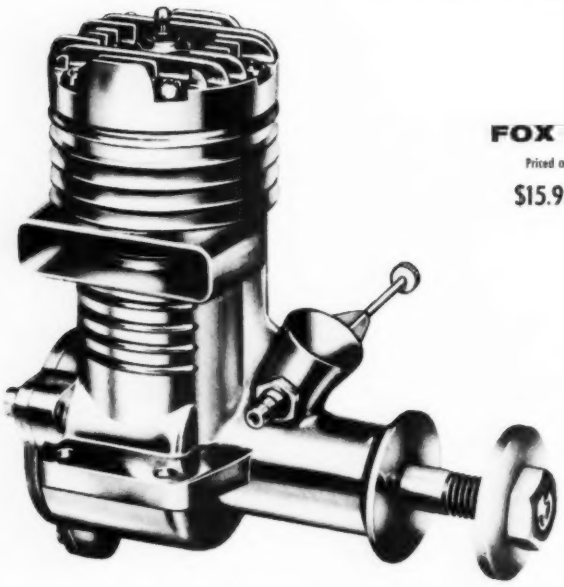

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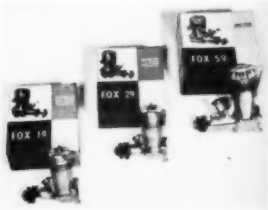

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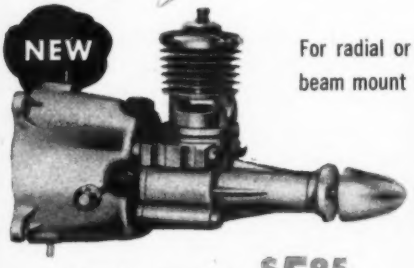

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27th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

APRIL 1956 Vol. LIV—No. 4

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by William Winter

► In the December 12 *Model Aviation*, the news bulletin of the Academy of Model Aeronautics, there's an analysis of the proposed rule changes brought out by the recent test balloting, including the observation that ". . . Efforts be made to bring the rules into line with FAI regulations so that American teams at International events will be equipped with models that have been tried and tested in competition." But the FAI now may change the rules for 1957. Maybe a 100 per cent increase in powerloadings, a reduction of rubber weight in Wakefield to 50 grams and ROG abolished. So things are really in the fan. What all this means to model design we'll leave to the International set. The first worry is how in thunderation they can cart the large economy size gassie all over the world. The boys are "shook." Radical changes, in fact any rule changes, tend to have an aftermath of unforeseen complications, requiring still more rule changes.

• • •

► According to the *Model Aviation* report (AMA members got this information in 1955), test balloting indicated disapproval of the idea for a general membership vote on rules. In free flight, favored engine classes were .000 to .050, Half-A; .051 to .1525, A (FAI limit); .1526 to .650, C. Powerloading preference was 115.6 oz. per cu. in. (FAI) —but that was before the FAI talked about doubling the loading which, if it becomes law in 1957, would mean we need a loading of 331.2 oz., assuming the U.S. hoped to tie in with International rules. Cheer up, boys, the Clipper Cargo guys are operating above 1,000 oz. powerloading. Four flights, four-minute limit, 15-second motor run, look likely for U.S. rules.

In rubber, the same flight plan looks likely. RC probably will have a third class called single-channel. For control-line, the Half-A whizzers may require 42-ft. lines; proto may have no wing-span requirement. MA then offers this observation: "While the proposal was not made or voted upon, it would seem that similar reduction in number of events and use of FAI displacements would be in order for controlline speed engine classifications." What means this?

• • •

► Claude "Mac" McCullough, the intrepid free flighter and Iowa tractor (non-flying) pilot who was speedily appointed chairman of the Contest Board by re-elected AMA president Keith

(*Continued on page 6*)

NEXT MONTH'S COVER
Lockheed Vega

PLANE ON THE COVER

One of the mainstay fighters coming into service is the Convair F-102A, side-by-side trainer version being cover artist Jo Kotula's subject this month. Ultra new in every respect, it combines the latest "coke bottle" fuselage concept with the delta-shaped wing for speeds beyond the speed of sound.

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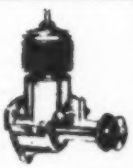

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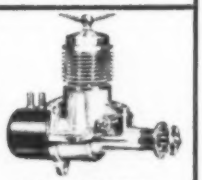

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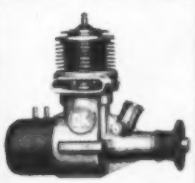

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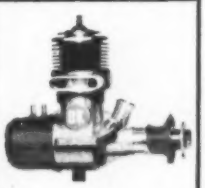

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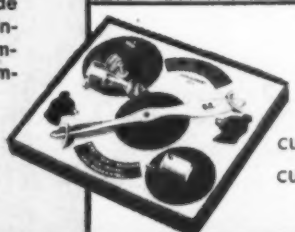

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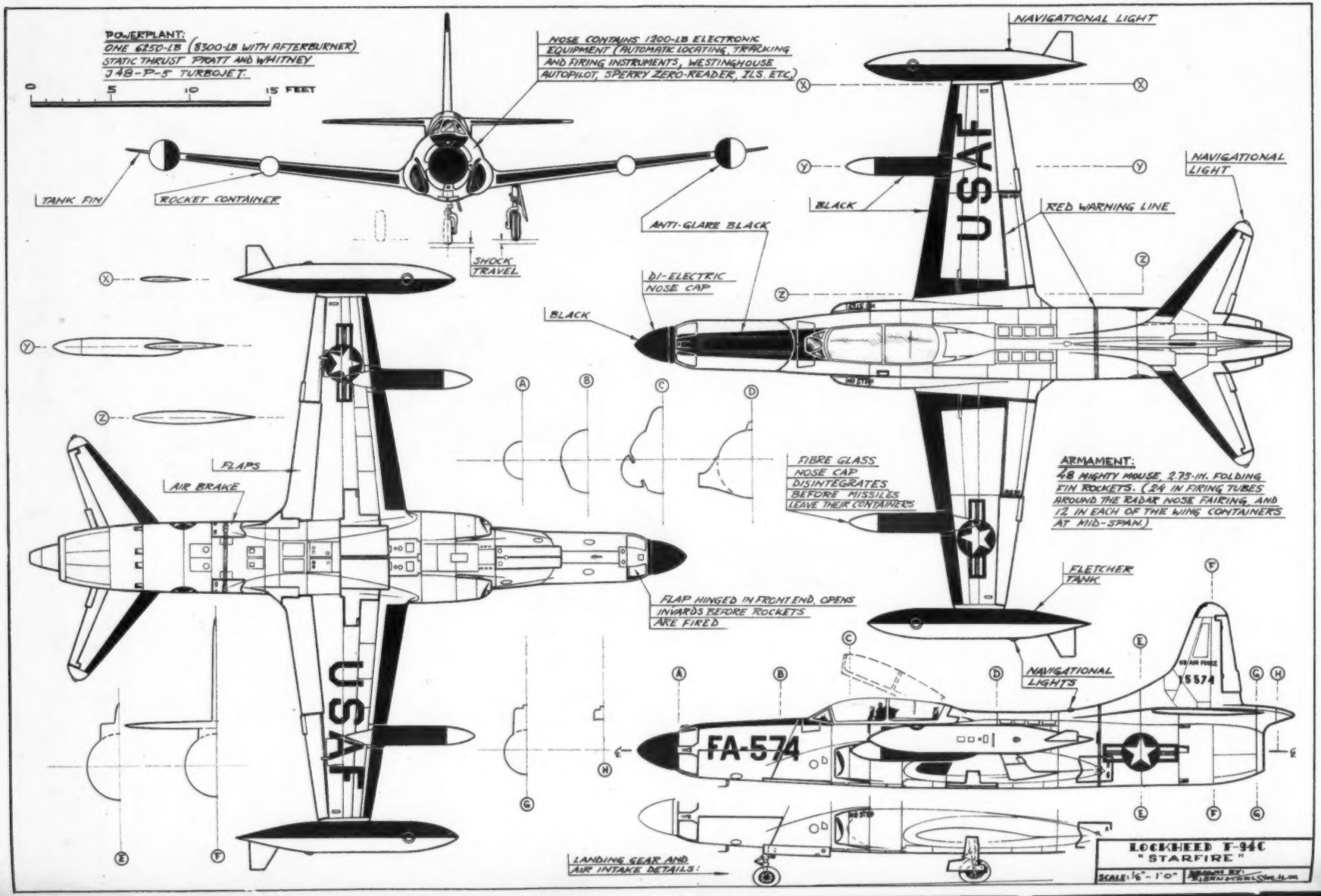
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MAN at Work

(*Continued from page 2*)

Storey from Disneyland (really!), is what the doctor ordered. States Mac, "I am resolved that the most important requirement is that the new rules be considered early, voted on early and be announced early.

"The district members of the Board must begin gathering rule proposals at once. The best way for the individual modeler to get his wishes into consideration is to write a letter with two carbon copies and send one to each of his district representatives and one to me. My hope is that the final rule ballot will be ready for publication in the June issue of *Model Aviation* and thus be circulated before the Nationals."

Since this is written in late January and appears on the stands in March, you guys will have to get with it!

• • •

► The Wakefield event will be held August 17-19 at Hoganas, Sweden; the power event, August 3-6, Cranfield, England; the speed event, September 15-16 at Genoa, Italy; the Nordic event, October 6-7 at Rome or Florence, Italy. Whatever happened to the world-wide "Olympics" idea? Can we send teams to all these different places, on different dates? Will the expense be more? What about sponsorship? The boys are either well broken-in—or stunned. But to quote the most outspoken, "It's a durn shame!" U.S. semi-finals are June 16-17, with four semi-final sites.

• • •

► In Southern Florida rat racing is an event, not a situation. Rat racing is extremely popular at every contest and the spectators leave the radio models to watch it. Two years ago, the Rat Racers were substituted for Team Racers—and the idea caught on like wild fire. The ships have fixed landing gear, a motor of not more than .35 displacement and fly on 60-ft. lines. The planes are not allowed to exceed 15 ft. in altitude, except when passing, and there's one refueling stop required. Two mechanics, refueling done from outside the circle.

These liberal rules bring every stunt man over with his fastest ship and all the survivors of the Combat event also enter. As Edward Hecker, our correspondent, describes it, "Anyone with a Team Racer slaps in a .35 and gives it a try. The "Sunday Flier" puts a hot engine in his favored profile and has a chance to bring home something besides gripes. I've even seen a scale Howard, usually sporting a McCoy .19, with a .29R Fox up front. Anybody with anything has a chance.

"For plain old club contests," says Hecker, "this event cannot be beat for maximum participation. My own club, the Gold Coast Modeleers, usually has more entrants in the Rat Race than in any two events combined and it is primarily an RC club!"

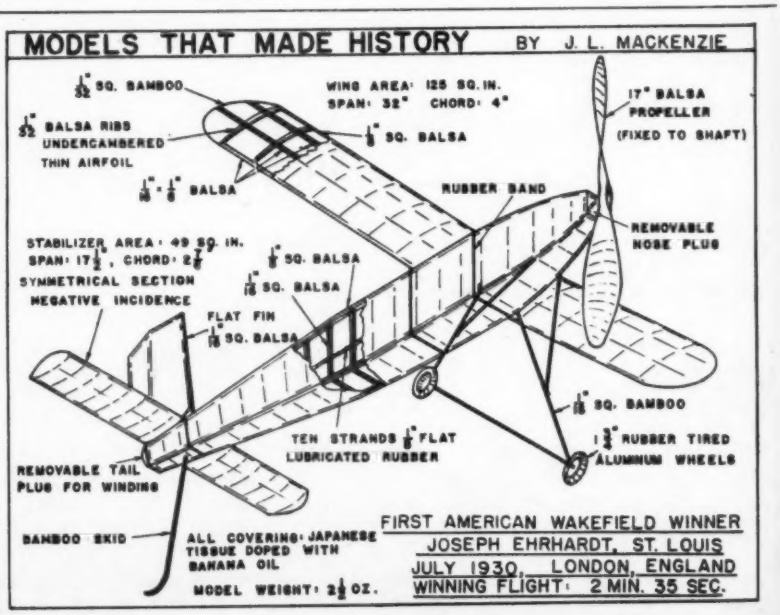
• • •

► Bill Netzeband is sporting a new Mark III version of his famous combat design, Half Fast (MAN, 4/55). The old Half Fast seemed to have it over the many kits which averaged about 150 sq. in. more area (about 500 sq. in.). The bigger jobs turn more tightly but are slower and stiffer at high speeds. The Half Fast has an 85 mph top and does 92 with the newest Torp .35. The correct combination of elevator area and motion produces a high speed turn that almost seems to accelerate. The new Half Fast has 4 in. more span, 1 in. more chord and uses a 12 per cent NACA wing section. Stability, turning radius and reaction time have all improved. Beefed up, it weighs about 21 oz. for the silk and nylon covered jobs.

• • •

► Remember the Flo-Torque (and Bill Halbert) propellers? In the days of ignition and gasoline, they were tops in props. So here's Bill again with a sample of a new covering paper which he distributes for the Minnesota Mining & Manufacturing Co. (that may be an odd name but the firm is an industrial giant). It's said to be a wet or dry tissue which is said to be stronger and to have controlled shrinkage, pulling tight without warps. White, red, blue, yellow. (H & W Sales and Engineering, 432 N. Wheeler St., St. Paul 4, Minn.) . . . Southern New Jersey Associated Modelers boost winter flying activities by having special meets for member clubs. Club with highest score wins a trophy put up by the Vineland Aeronauts. The association meets every six weeks with a maximum of three representatives from each club voting, though all welcome. Pleasure follows bus-

(*Continued on page 54*)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HI-FLI

By **PHILIP O. KRAFT**

Tired of fast, hot aircraft that make like post-hole diggers? This he-man's .15 job puts out, but requires minimum of adjustments. S'fact.

On this VTO take-off for benefit of the photographer, Phil forgot to light the fuse and a 46-minute chase resulted. Power: a Webra Mach 1. Wind should always be at your back when making VTO take-offs like this.

Even under extreme power, Kraft claims ship is safe, forgiving errors.

► After a 12-year lay-off, the author started model building again a few years ago and soon found that there was much to learn and unlearn in developing a successful contest free flight. First experiments were aimed at high efficiency with aspect ratios of from 10 or 12:1 and glider-type airfoils. Universally, these designs had beautiful glides but proved completely unsuited to today's contest conditions. It soon became evident that there is no substitute for consistently putting a gas model 'way up. The greater the altitude achieved, the greater chance the model has to drift into thermal activity; and even without thermals, the average time will be consistently good.

The well-known prerequisites for a fast climb are as high a power-to-weight ratio as possible, clean design and the ability of the model to convert the engine's power into a consistently smooth flight pattern. Of the three, the latter is probably the most important.

The difficulty with hot, fast aircraft is that most of them end up making like post hole diggers. Only with careful adjustment by an expert are most of today's contest designs capable of handling large amounts of power. Cross-thrust and rudder, thrust into wing wash and other counteracting force adjustments are usually brought into

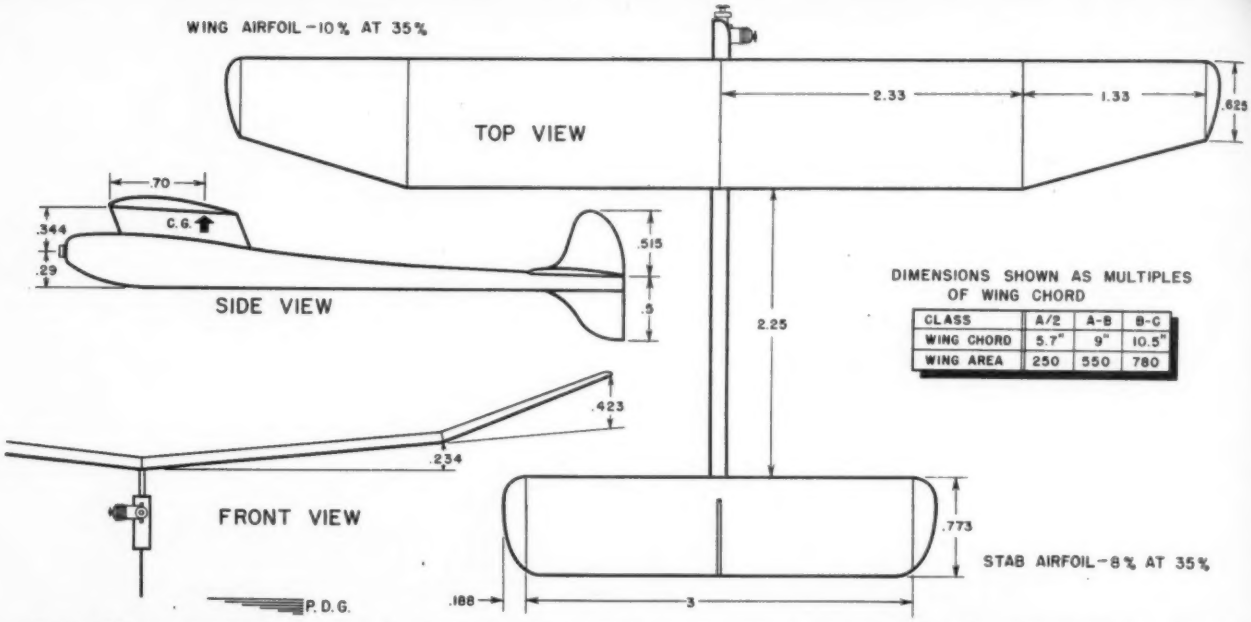
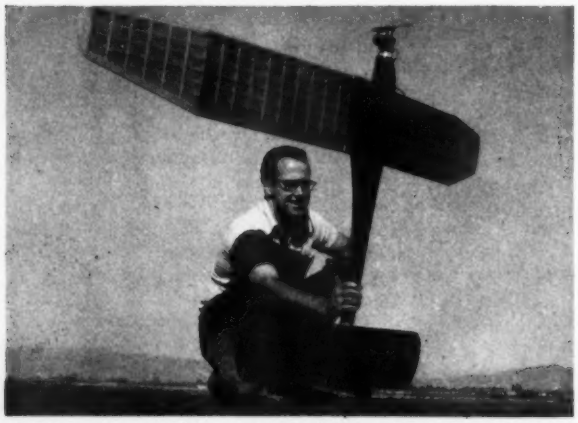


Chart enables you to make drawings for other classes. Adjustments built in; do not, repeat, do not, use offset thrust, warps. That's what man sez.

Side-mounted Webra Diesel, streamlining of timer case. In 12 big California contests Hi-Flis took nine firsts, several seconds, thirds.

Modified Austin timer and DE fuel shut-off fit compactly, give short fuel draw. The climb-out is almost straight-up, right-hand corkscrew.



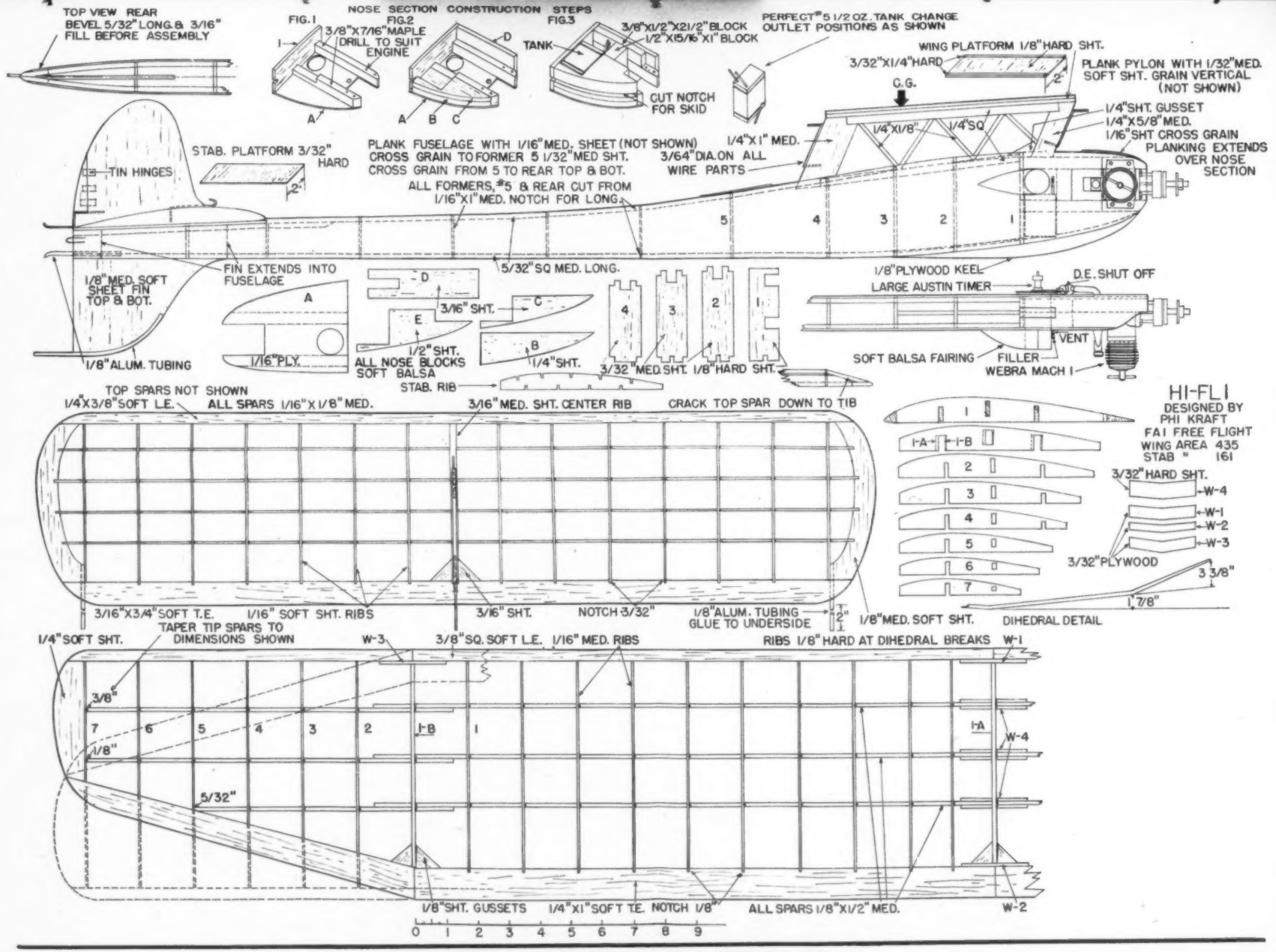
And if you like them big . . . author builds Hi-Flis in five sizes, from 184 sq. in. to 780 sq. in. of wing area. Jap tissue, light and rigid.

the picture. The trouble with adjusting flight pattern in a model is that the effects of the various forces employed vary widely with speed. Any mishandling which upsets the delicate balance of such a model, with resulting increase in flight speed, often ends in disaster.

Aside from achieving happy performance, the primary aim in developing Hi-Fli was to produce a model in which slight trim would be the only necessary adjustment. After a great deal of experimentation, this FAI-sized design incorporated the solution to that problem. The first model of this design flew in April of 1954 and since then five different sizes ranging from 184 sq. in. to 780 sq. in. wing area have all flown with identical characteristics: i.e., an extremely fast climb in a loose—almost straight-up—right corkscrew with perfect transition to a good glide. No radical adjustments have been necessary on any Hi-Fli.

Also above average has been contest success. In 12 major Southern California contests, Hi-Fli has won nine firsts and several seconds and thirds.

The model presented here (*Continued on page 36*)



FULL SIZE PLANS AVAILABLE. SEE PAGE 44.

Something to do!

When the Boys' Club began the experiment, it was doubted that the boys would build airplanes. But lads like Ken Martu, building the Comet Sparky, his second model, go for worthwhile action.

It's axiomatic that any boy who makes model airplanes is too busy to get into trouble. This is the moving story of a boys' group in Pittsburgh, details of program.

By WILLIAM H. RASSBACH

► Nothing was farther from my mind, in 1954, than social work—or the concept that aeromodeling and social work had a common meeting ground. I was a college senior, having trouble finding enough time to do my homework; but when a friend offered me a job he was quitting, all I could think of, as a penurious student, was earning $3 for two hours of work a night.

What was the job? That of Model Airplane Shop Instructor of the Boys' Club of Pittsburgh, Pa., a branch of the Boys' Clubs of America, an organization that combats juvenile delinquency with a program of recreation and instruction in wholesome standards of living. This club branch is located in a community predominantly Polish—a low income, though extremely neat and clean section of the city—where chief income is derived from steel works, trucking, rail yards and small shops.

My sole instructions were: "I don't care if they build planes or not and I don't think they will. But keep them here and off the streets." And if I was at sea, so were the kids, all the great crowd of active, energetic youngsters with nothing to do—even during the daytime, when lack of space and organization prevented even the formation of baseball teams at school. Oh, yes, there are baseball games on the grounds of the two local parks: three or four games and over 3,000 boys in the area—so they spend their time on street corners, just standing or talking. It is greatly to their credit that delinquency problems in the area are not many times inflated.

And the model shop I walked into was just an extension of that street corner, geared to the path the kids were being eased into by circumstances: there were dime models and plastic models. A boy would come in looking for something to do. He would buy a plane, maybe (it was a way to spend time, wasn't it?), assemble it in 15 minutes or so and leave, once again with nothing to do. Many "reasons" were advanced for this policy: the boys could not afford more expensive planes; they did not have the patience to build more complicated kits; they were lazy and "wanted" planes they could build in one two-hour session.

Bunk! Some of these kids had dreams and tried to build big, complicated kits they had brought. They wanted a finished stick and paper model airplane. And the *awe* their voices held as they talked of the plane-to-be! Crowds would gather to admire the project and to tell each other about the one they would build "someday"—and they did not have the skill to build it.

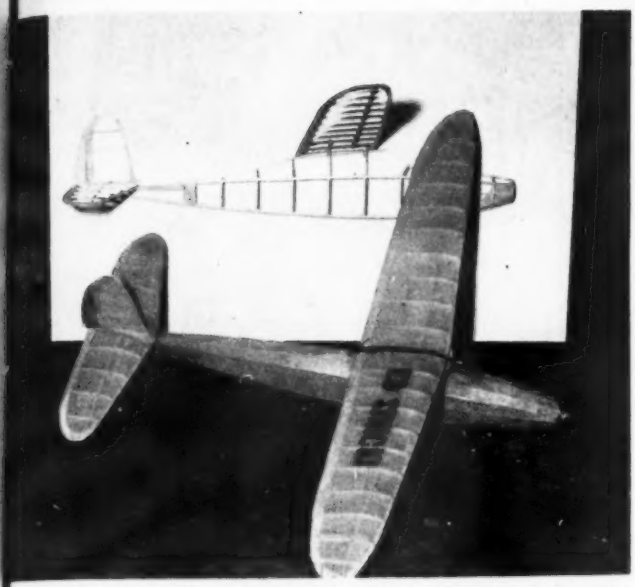
One of the boys had just messed up a scale model fighter plane that he couldn't paper, so I tried to find one that he *could* build. I thought I found it in a large model Taylorcraft, a plane with almost no curves. I started him on this model and soon the rest of the bunch wanted the same project. As time went on, however, I began to see that the large plane was a bit beyond the boys so I started the others on a 2 ft. wingspan model of the same plane. This was all cut-out work from printed sheets—no easy project—but it was a model a boy could be proud that he put together.

Eventually, we had 10 or more building at one time! Here was a project that took every bit of attention you could put into it and it kept you busy two weeks or more. Something to do! The boys loved it! But one obstacle was the universal sense of mischief that belongs to boyhood: only a short length of time could a boy remain at work without starting a fight, or a paper glider contest, or a game of catch (with someone else's coat)—a good way to break up both models and the class itself—so I had to amplify my efforts to keep the boys busy.

This led to starting off meetings with a joke session. Once I started the ball rolling, the boys kept it in active motion—and best of all, they kept their seats without squirming! After some 10 minutes, someone would return to his model and soon the whole crew was busy once again. So little effort was required of me in order to maintain an even keel: only a little leading was necessary and then the fellows ran the meeting sensibly according to their needs.

Of course, individual attention where necessary helped encourage a commendable self-control. Pick out the boys showing signs of restlessness, talk to them one at a time—starting, perhaps, with special model instruction—and pretty soon there'd be an outpouring of the tribulations of the school day or gripes about the kid brother. But they would soon return to work purged and happy.

Guiding boys in model building is different from giving



Finished Sparky by Ed Siwicki and a training aid consisting of a half-Sparky mounted on cardboard. Last of four-model course, dollar T-Craft.

Eleven-year-old Jackie Jedrazyewski here successfully papering Sparky suggests the model industry might have more faith in boys' abilities.

sports instructions. In modeling, complete concentration is required and there is no competition with other boys. Therefore, a boy finds his place in the model shop gang without having to prove himself. That secure place in the group and pride in his skill give him confidence.

And that confidence revealed itself in the atmosphere of the room: the boys were content, quiet and happy. They would come in and begin work, after a minute or two of greeting friends, without any urging on my part. In fact, I did nothing but instruct: there were no policeman's duties. The class started, ran and ended with only a few general comments each night. Rarely did I have to restrict a boy's actions.

In fact, it was like a riot in reverse and the feeling of peace in the room was so strong that we soon got as regular visitors kids who were not allowed in other shops because they were discipline problems. They never got into trouble in the model shop: there was hardly reason to notice their presence!

And so the rest of the year passed, with me as a guide for a bunch of kids and them following. But sometimes they led and that was when I was proud of them. One day a delegation said, "We want to bring a boy into the class. He doesn't get along very good anywhere and he may try to steal something or break a plane. But we'll watch him. We want him in the class because he's so lonely." And they brought him in and they took care of him. And while he was there, he was happy and never caused trouble—in the class, in school or on the street.

That was worth the time I spent there. If that one boy stays out of trouble, it will be worth the money spent to keep that club open. And he was only one boy in one craft class of the many Boys' Clubs throughout the country.

MODEL BUILDING COURSE

Here is a general outline of a model building program that was successful with this group of boys, involving construction, covering and finishing of model airframes, based on four Comet kits: Struct-O-Speed Taylorcraft (10c), Flying Model Taylorcraft (25c), Sparky (50c), Taylorcraft ($1).

To these plans, add demonstration models in various stages of completion. (*Continued on page 48*)

Dollar Comet Hell Cat, a kind of post-course fifth plane, is no problem to 13-year-old Ed Siwicki. Course required some tricky innovations.

When shown how, kids can do amazing things—stringers and bulkheads do not stop them. Big question is: do kit designers sense tough features?

FULL SIZE PLANS AVAILABLE. SEE PAGE 44.

For big engines use 70-100 feet of .016 line, suggests author, here cranking a .60. Always pull-test those lines on a peppy .60! And no kinks.

JUMBO . .

By CARL RISTEEN

For those moth-balled .49's to .60's here's a stunt job that really cuts capers. Has speed, smoothness, flies mighty purty pattern.

Vertical launches, drop-out launches, and maneuvers you've never done are possible for Jumbo.

► To plunge into first things first, Jumbo was designed for high speed, smooth operation and high maneuverability unhampered by overheating and sensitivity that might mar a graceful stunt pattern.

In planning the first model, I decided to try a low wingloading, high power and good streamlining for minimum parasitic drag. Efficient controls would also be needed to avoid unnecessary drag and turbulence in tight maneuvers at high speed. I decided to experiment with larger-than-average wing flaps and elevators on the theory that, operating through lesser angles to the slipstream, they would be more efficient.

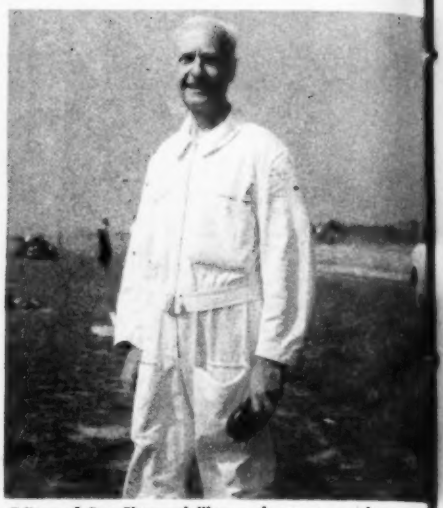
The first model was built with an extremely low weight, achieved through the use of very light wood and a skimpy finish. A thin airfoil was used along with a fairly short tail moment arm.

In flight, the model combined great speed with an incredibly small turning radius. It would not, however, maintain good line tension throughout difficult maneuvers on long lines and was too fast on short lines.

The next model included greater thrust offset, more wing counterweight, stronger wood and a better finish. A thicker airfoil was also used to provide better lift for tight turns. Consequently, this model flew much more smoothly and performed the stunt pattern with ease on 100 ft. lines. I found it possible to perform unusual stunts with this aircraft which are impossible to a normal stunt model because of higher weight and powerloading. Vertical take-offs were performed with great ease and precision, as well as drop-out launches with the model held horizontally only a few inches off the ground and released from a stand-still. Apparently, the large flaps working with the prop-wash provided enough lift to prevent the model from falling before it gained speed.

(*Continued on page 49*)

Rudolph Lindner, World Nordic Champ, exhibits superb form which made him world's best in 1954-55. Lindner has been known to move about for one minute while making launch until thermal is felt.



Editor of *Der Flugmodellbau*, who was an airline flight captain before war, Herr Gymnich.

report on Germany

Two of the big three World events were won last year by West Germany. To check on developments in that country, the author attended the West German Nats for MAN.

► In the morning haze over Waggum, the airport at Brunswick, Germany, several Wakefield models were settling to the ground after test flights. A voice speaking German came through the loudspeaker announcing the time as 6:30, beginning the fourth of five Wakefield rounds. It was a sleepy photographer who stumbled from the administrative building to record the events at the peak of German aeromodeling, the "Deutsche Modell-Meisterschaften," literally translated: the German National Championships.

The men on the field represented the cream of Germany's fliers, chosen by elimination in the various "lands" (equivalent to our states) of Germany, from Bavaria to the Danish border. More than technical information could be gathered, as is illustrated by descriptions heard of modeling in the Russian zone of Germany. A few were able to come across the interzonal border to Brunswick. They told of the East German 1954 contest (separate from West Germany) at which contestants spent a week together, having to listen to political speeches, run obstacle courses and practice on a rifle range before they could fly their models! Several of the East German fellows had brought a small pulse-jet along to sell, in order that they could take some balsa back

Europeans have great respect for "theory" and so-called radical designs, such as this successful gas-powered wing. After this take-off, the model climbed in fast, stable circles, glided stably.

Heidemann, '54 gas champ. Follows "power glider" trend. He favors Goldberg airfoil.

Highest performance gas job in Germany today is Barth's, with Mach-1 Diesel and small prop giving straight-up climb after VTO. Odd section?

Most development has been in Nordic field, inspired by career specialists in such designs. Dural tube fuselage here, nylon cord turbulators.

By KEITH K. HOOVER

with them. Building materials are "not available" to those outside the state-sponsored (i.e., Communist) model club in the Russian Zone.

In Germany, the language difference produces a number of new terms of which these are typical: wing sweep is "arrow form," one's pet model is his "canoe," while a disappointing one is a "duck." It was interesting to note the clubs in action, indicating that abroad, as here, group effort really pays off. In a number of instances, well known contestants had young flying partners whom they taught and helped to fly; the winner of the small gas class (similar to our Half-A) was just such a young fellow (16), flying his advisor's design. Almost every group had some members downwind with or without cars and many used flags to signal these retrievers when one of the club was flying. In high performance free flight events, a man can't fly alone. Officials were brought to the meet by the German Aero Club for timing, etc., and were *all* people with experience, largely fliers who had "missed out" in the local eliminations. There was an amazing freedom from "rhubarbs," because even minor officials knew their stuff! Sportsmanship was unparalleled, as rivals in the same event helped each other make repairs and adjustments! The degree of hospitality offered a visitor is indicated by the fact that, on presentation of AMA card and mention of Carl Wheeley's magic name, your reporter was *given* all meals and a bed in the administration building with the officials.

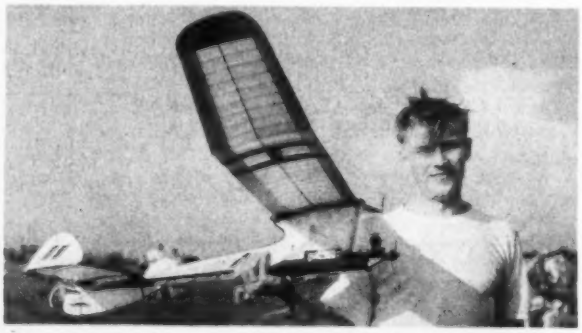
The contest was a dream to fly in. Through the eliminations, the number of contestants was held to about 300, meaning a minimum of nerve-wracking waiting to fly. Since the names and states of all contestants were known, they flew in a pre-determined order—no standing in line; the contestant knew ahead of time in which part of any round he would fly. Timers and judges were always available. The number of events was broad, but not out of reason: Gliders: A.1 (like our limited) and A.2 (Nordic), Wakefield, Power: FAI (Class 1) and small gas to .065 displacement (Class L), and Flying Wings: glider, rubber and power. Controlline events included speed, stunt, team racing, combat (in German, "fox-hunt"), flying scale and beauty. Concentration was on the free flight events and in coming years, there will be a separate (*Continued on page* 18)

Leon Shulman's Banshee influenced Power of Mach-1 got this builder into trouble. Excessive dihedral, swept-forward for control. Glide, ouch!

Tailless rubber job, typical of many flying wing classes under rules. Less consistent than conventional rubber jobs, but Nordic wings good.

Author talks shop at German Nats. L to R—Naegele (white shirt), kit designer; Dr. Eppler, airfoil researcher; Hoover; Hacklinger, the world's leading Nordic designer. Note preferences for shorts as flying clothes.

Small A.1 Class Nordic glider reveals sweep-forward used in effort to increase performance. Some Germans doing 1¼ minutes on 65 ft. of line.



FAI gas winner at German Nats, by Piesk, featured a two-wheel retracting landing gear. Odd feature, for us, is the flight-adjusted rud tab.

Rechenberg, Berlin, with flawless Nordic typical of German designs. In 1954, was second to Lindner in Internats. Turbulators, stab dihedral.

controlline championship meeting. The noted German radio man, Stegmeier, was much in evidence with his parachute and leaflet-dropping stunts. Much of his equipment is now on the market for interested RC purchasers.

The major design trends of interest to U.S. modelers are those of the international free flight classes. The Webra motors and metal fuselages often used by German controlline men are familiar to us. The flying wing events produce a number of attempted formulae of which the accompanying pictures are typical. Still, it is largely in the Nordic, Wakefield and FAI power events that our boys will be seeing German contestants. To sum these up, your reporter's opinion is: "Look out for these boys; they're coming up and will be top contenders in all three events."

The basic reason for German success is use of scientific methods. In contest work there are almost no kits or copies to be seen. Clubs and individuals are constantly experimenting; the best model builders and theorists throughout the country know each other and share information. In addition, many of these boys know English and can capitalize on advances made in the U.S. and Britain. At the contest every evening was spent in lecture or film presentation and discussion, led by the country's leading theorists. Small wonder that two of the three individual world champions in 1955 were German!

Turning to German design itself, the Nordic or A.2 glider is a logical beginning point. Such specialists as Lindner, Hacklinger and Denzin have achieved world reputation. The current European trend toward long moment arms and slim fuselages following the success of Oskar Czepa (Austria) has been led by German gliders of the past several years. Hacklinger, with the Vienna and Danish schools of thought, has provided the significant airfoil development of the same period. Hacklinger and Lindner possess towline launching technique which has to be seen to be believed. Both of these boys run *full speed* all over a flying site to find just the thermal they want—with the towline straight above them, the glider behaving like a kite—then release the ship going *up*. Your reporter's mouth is still open. The FAI rule limiting the time of tow to two minutes stems from this fantastic achievement.

The "typical" '55 German Nordic is a more conservative design than those formerly seen, with aspect ratios of 1:15 to 1:20 and "stick" fuselages. The current attempt is to achieve good performance with the same model under calm or windy conditions. Hacklinger's newest at Brunswick, although it did not win (it was a victim of alternating thermal and downdraft conditions) was obviously *the* superior airplane. It was never seen to stall twice; that is, after kicked into a stall by a wind gust, it was gliding smoothly again each time before a second stall could occur. To achieve this result, Hacklinger uses his original airfoils and a shifting ballast weight which allows him to alter incidence difference between wing and stab while keeping model weight constant. In calm air, Hacklinger decreases incidence, moves his ballast backward toward the center of gravity and achieves a time of one minute 20 seconds from a 65 ft. line (20 meters).

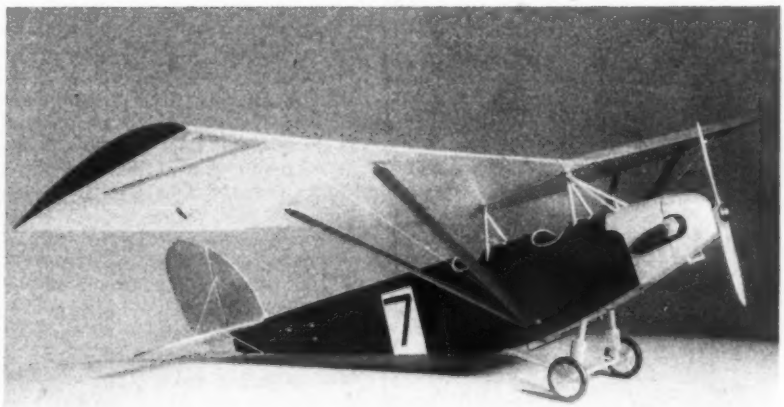
Lindner has already published an article declaring his intent to make construction changes which will permit him to use the same model under all weather conditions. Fuselages of German Nordics are almost without exception balsa tubes or sandwiches of balsa and hardwood, but they are no longer overly small in cross-section. A minimal difference between position of tow hook and CG affords one less force moment for which compensation is necessary, so most German A.2's are mid-, almost low-wing. Side area at the tail is usually below the stabilizer, which is likely to have slight dihedral, in order that (*Continued on page* 41)

Supermarine SPARROW

By HAL COVER

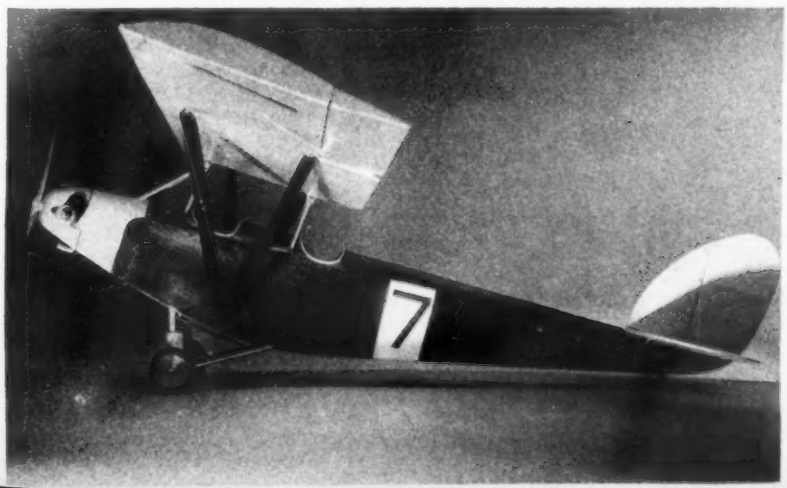
This charming 1924 British lightplane, a natural flying scale for .049 engines. It's a consistent contest winner.

Posed by the author, Number 7 shows off its good detail. Beauty of a simple ship is that details can be duplicated without blowing stack.



Finish must be good for scale points. Silver wings and tail, a dark blue fuselage, black numbers. Some special points, so do follow text.

Parasols always seem to fly well. Metal struts under wing and for the gear will stand up and look scale. Old Cub cylinder duplicates twin.

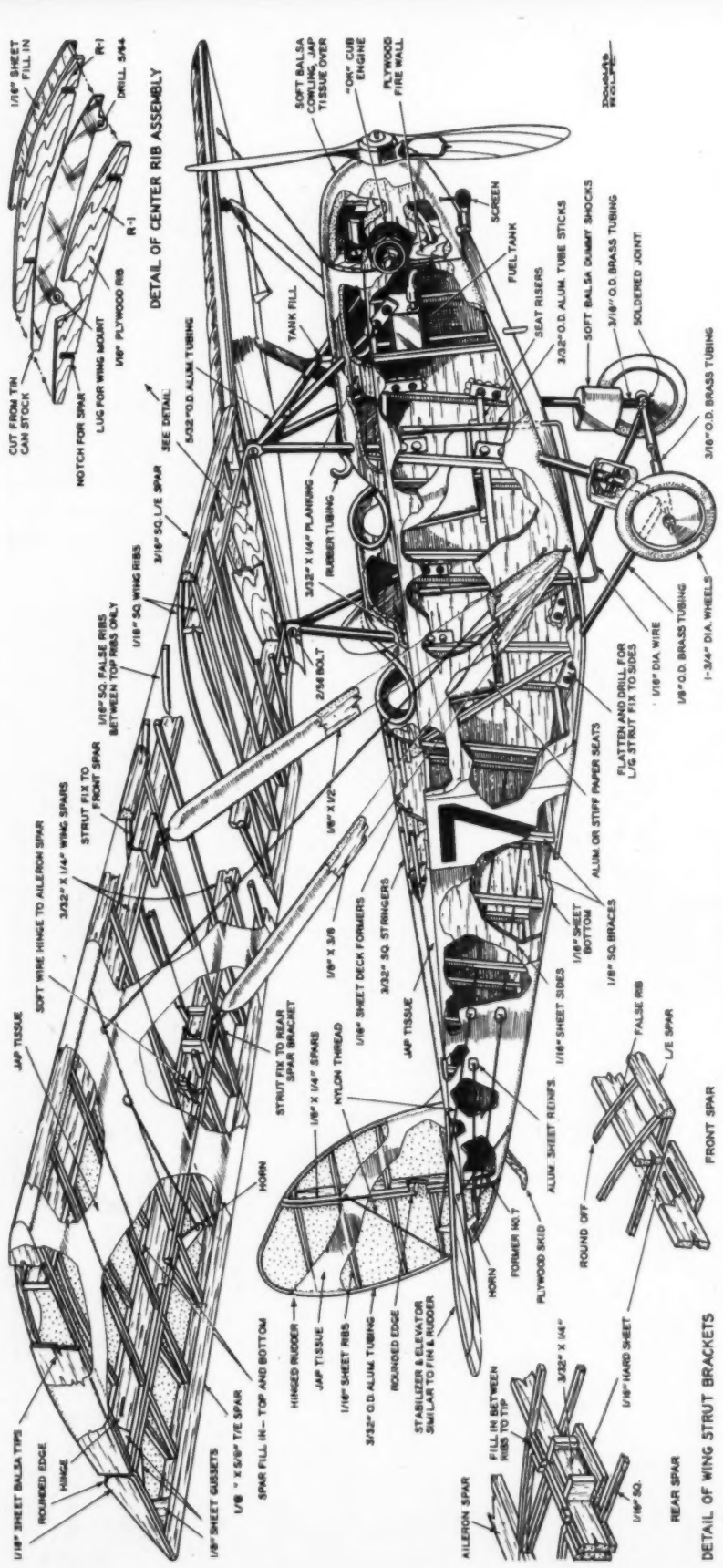


► In 1924, Supermarine Aviation Works, Ltd., deviated from its usual sea-going craft to build the Sparrow: Mark I. It was built to compete in the British Air Ministry's 1924 competition for dual two-seat lightplanes. The Mark I was a biplane and a stroke of bad luck forced it out of competition.

Two years later saw the *Daily Mail* contest for lightplanes. The Mark II was entered in this contest but, not being built for speed, could not hold the minimum permissible speed of 50 mph and was disqualified. After this contest, the plane was fitted with three other interchangeable wings with different airfoils. Specifications and performance were: *Span:* 34 ft.; *Length:* 23 ft. 10 in.; *Height;* 7 ft. 5 in.; *Area:* 188 sq. ft.; *Top Speed:* 63 mph; *Low Speed:* 31 mph; *Rate of Climb:* 5,000 ft. in 33 minutes.

The Sparrow makes an excellent model. This is its record: *Inglewood Flightmasters' Scale Meet, 1954:* Sr., first place; Scale Finish Testor's Award; *San Diego Scale Meet, 1955:* High scale points; Sr., third place; *Nationals, 1955:* Sr., second place; *Flightmasters' Scale Meet, 1955:* Scale Fidelity Award; Scale Finish Testor's Award; Sr., second place.

This should whet your keenness to go places and do things with this model, so let's start construction with the stabilizer. Aluminum tubing, 3/32, is wrapped around a bottle, 4 in. dia., the same diameter as the tip of the stab. The tubing is then cut into three sections: the first section is the tail plane; the second and third, the two elevators. Add ⅜ x ¼ spars to both tail plane and elevators; then add ribs. The LE of the elevators is shaped to half-round sections. Sand the ribs to streamlined shape and join stab and elevators



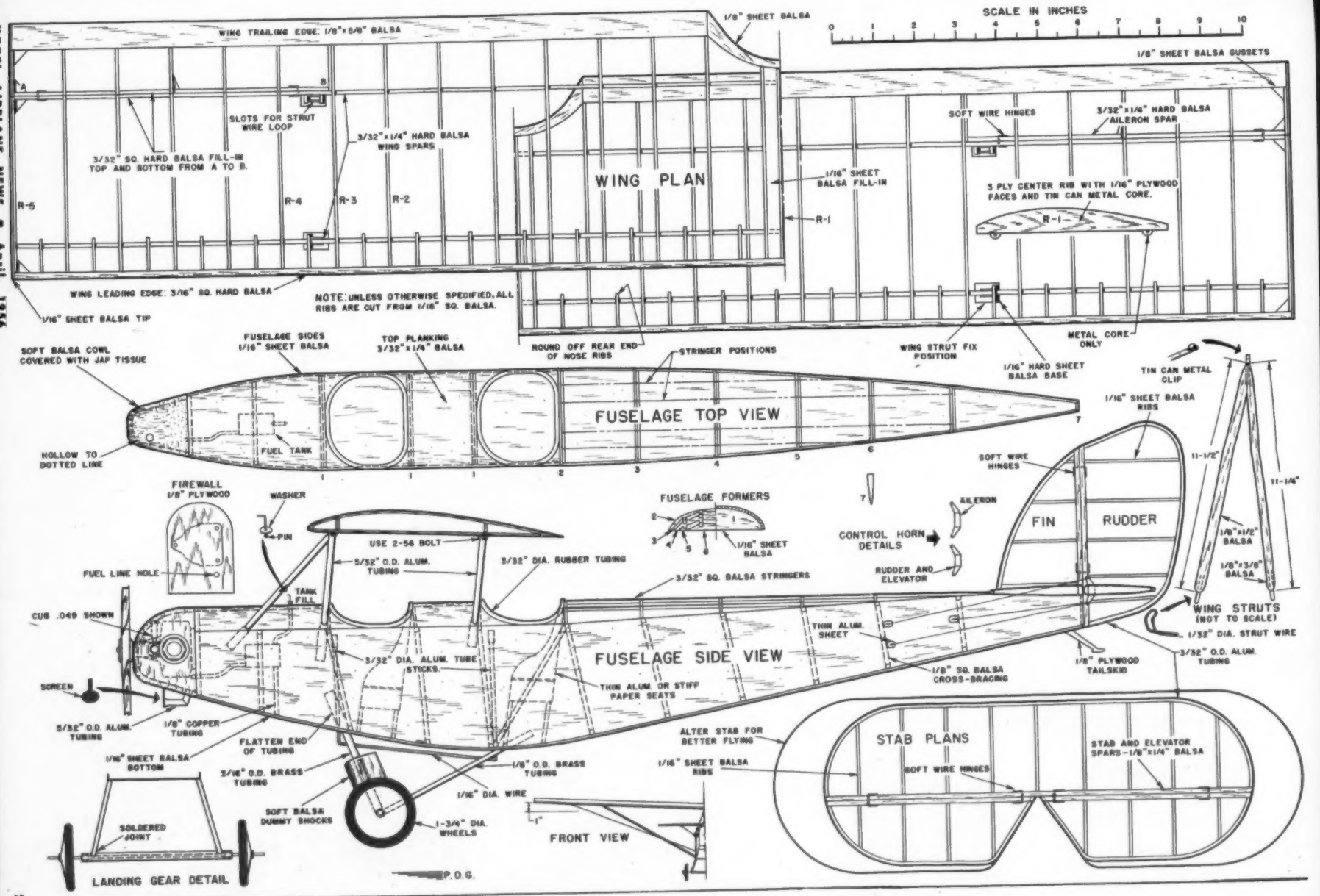
by pieces of soft copper or aluminum wire, one piece at each end of the two elevators.

The fin is made in two parts—the fin and rudder—shaped similarly to the stab. The bottom rib and ¼ x ¾ spar are cemented together, then tubing and ribs are put in place and sanded to a streamlined shape. Add the two hinges.

This brings us to the wing. Make a template of wing rib out of metal or plywood and cut 28 ribs out of hard 1/16 sheet. As each one is cut, sand the top of next one. Lay LE and TE in place, then pin them down. Add the 1/16 sq. ribs and position the 3/32 x ¼ spars. One piece of 3/32 x ¼ is added against the back of the rear spar the length of the aileron, then the ribs are added to top. The false ribs are made in the same manner as the ribs, but these are put only on top and the back is rounded off to prevent sharp protrusion when the wing is covered.

The wing is taken up and 1 in. dihedral is added to each tip. The spars are braced as shown with 1/16 plywood on both sides. Locate fitting for the struts between Ribs 3 and 4; then add sheet on the bottom. Note the center rib is laminated out of two pieces of plywood and one of metal. Cut out the metal rib and drill holes in the two lugs 5/64 dia. for the 2-56 bolt to go through, then cut out the two plywood ribs in the same manner, excepting only the lugs, and laminate them together. When the rib is dry, cut two notches for the spar and add it to the center of the wing and to both sides of bottom add 1/16 x ¾. Between Ribs 3 and 5 the top and bottom of the spar and aileron spar 3/32 sq. is put on. After these are dry, cut apart between the two pairs of ailerons, sand the LE of the aileron to half-round shape and replace on wing with two hinges, as shown. There is a tip rib of 1/16 sheet that is put on after tip is sanded flat.

For the fuselage, sides are cut out of medium 1/16 sheet, the uprights are added, ¼ plywood firewall is cemented on and ¼ sq. cross-braces are added. Put Former 7 in place, add the Formers from 1 to 6, then four 3/32 sq. stringers. The landing gear is made of 3/16 dia. brass or aluminum tubing. The upper ends are flattened and holes drilled in them, then cemented to the fuselage. Be sure to use plenty of cement. Note the wing mounts are made in the same order, but are of 5/32 dia. aluminum. Drill a 5/64 dia. hole in tip for bolt to go through. The tank is mounted in fuselage as shown on plans and it should run engine for about one minute. The planking on top is ¼ x 3/32 strips. Shape cockpits, put hooks on sides of fuselage for struts, then place (*Continued on page 40*)



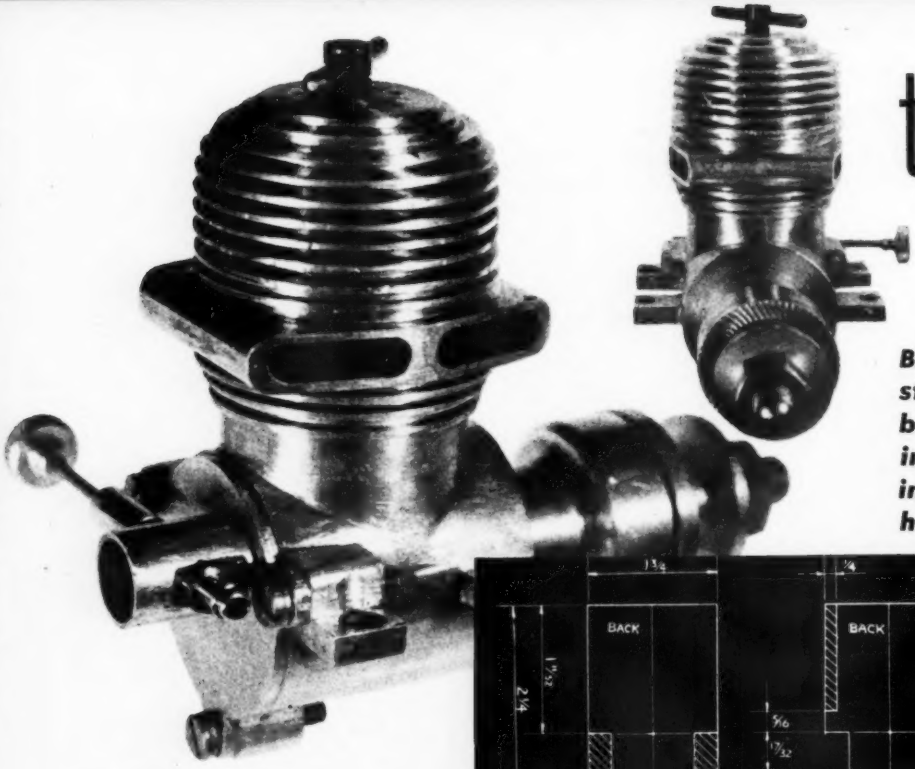
FULL SIZE PLANS AVAILABLE. SEE PAGE 44.

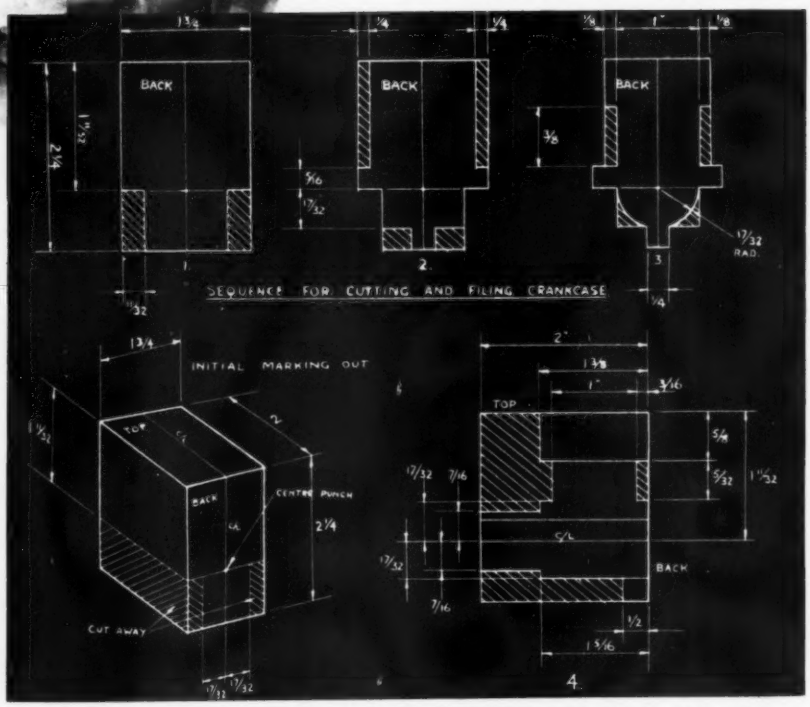
the MAN .19

Part One

By E. C. MARTIN

Beginning a three-part construction series for home-built engine. Shop classes, individuals with metal working equipment, will discover hours of rewarding pleasure.





Editor's Note: *More than six years ago, MAN published two home-built engine projects which, surprisingly enough, were well received. Pictures of reader-built engines have been received ever since. Not a novelty, but a "real" engine, the MAN .19 falls within the capabilities of the amateur and student machinist.*

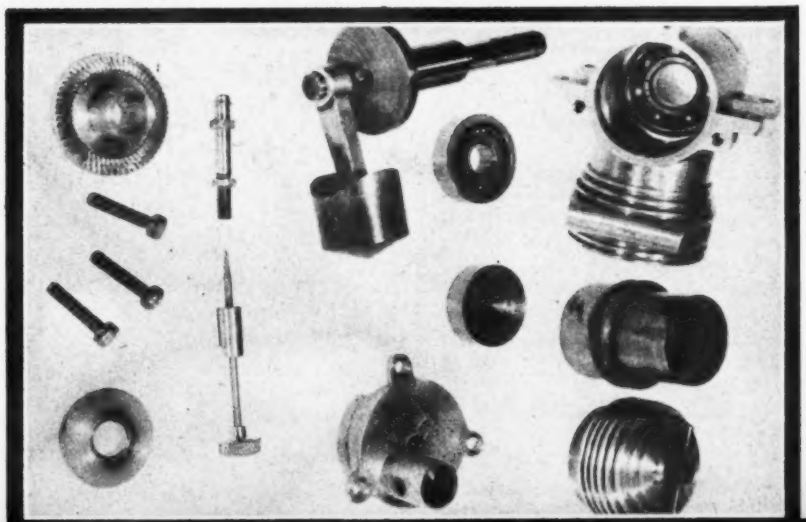
► Why build an engine? In fact, why build anything, when in America there is inevitably someone doing it efficiently at a competitive price?

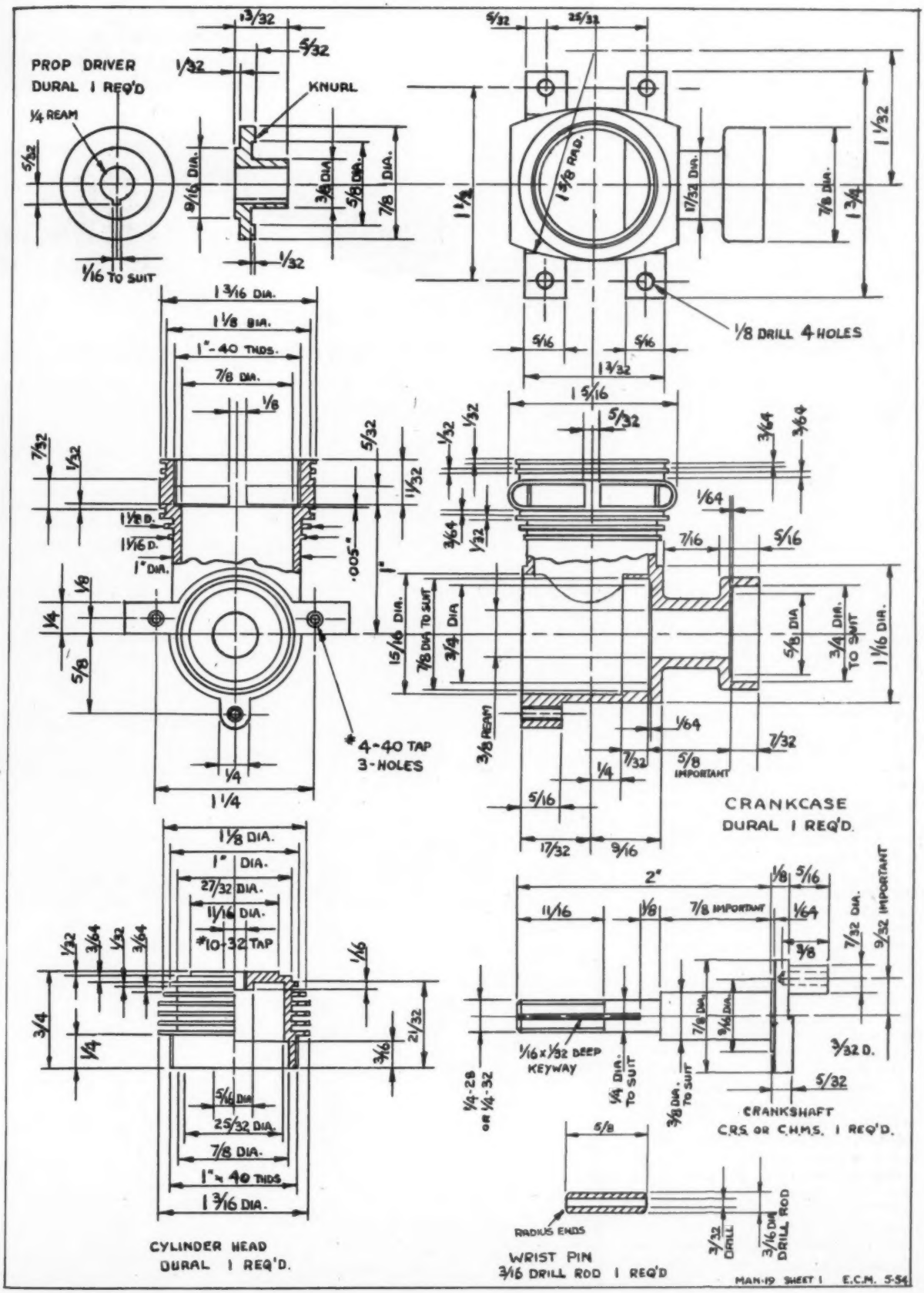
We have been building engines, models and even sports cars as a hobby since schooldays and there isn't any simple answer. Part of it is curiosity: conceive an idea and make it work. Part of it is self-satisfaction at having done it and, perhaps most of all, it is discontent with the products one can buy and the desire to make something better.

Most serious modelers have these motives and, in designing the MAN .19, we have striven to allow scope for departure from the basic design in order that the inquisitive may experiment with their own ideas and thereby learn as well as accomplish.

We thought hard and long about the form this engine should take. Piston-cylinder fits are tricky in the small sizes and large engines are less popular. A .19 seemed a fair compromise. It seemed logical to fill a spot at present vacant among the commercial sizes and, although there are many good .19 glow-pluggers, there is no home-produced Diesel of this size. Upward from this displacement, the advantages of compression ignition are less apparent (*Continued on page 50*)

Top of page—Rear quarter and frontal views of the Diesel. Below—Parts add up to hot performer.




PROP DRIVER
DURAL 1 REQ'D
1/4 REAM
1/16 TO SUIT
KNURL
1 3/16 DIA.
1 1/8 DIA.
1"-40 THDS.
7/8 DIA.
1/8 D.
1 1/16 D.
1" DIA.
.005"
*4-40 TAP
3-HOLES
1 1/4
1/8 DRILL 4 HOLES
1 5/16
CRANKCASE
DURAL 1 REQ'D.
2"
1/16 x 1/32 DEEP KEYWAY
1/4-28 OR 1/4-32
3/32 D.
CRANKSHAFT
CRS OR CHMS. 1 REQ'D.
CYLINDER HEAD
DURAL 1 REQ'D.
RADIUS ENDS
WRIST PIN
3/16 DRILL ROD 1 REQ'D
MAN-19 SHEET 1 E.C.M. 5-54

Using cascaded escapements for up, down, left, right and motor, Chuck Boyer has flown LW Cruiser week-ends for 1½ years. Rigs everything right, then spends all the time flying and not fiddling.

FOUR pages articles, plans, the excitingly new, round up the things that are truly important to the active flier.

RADIO

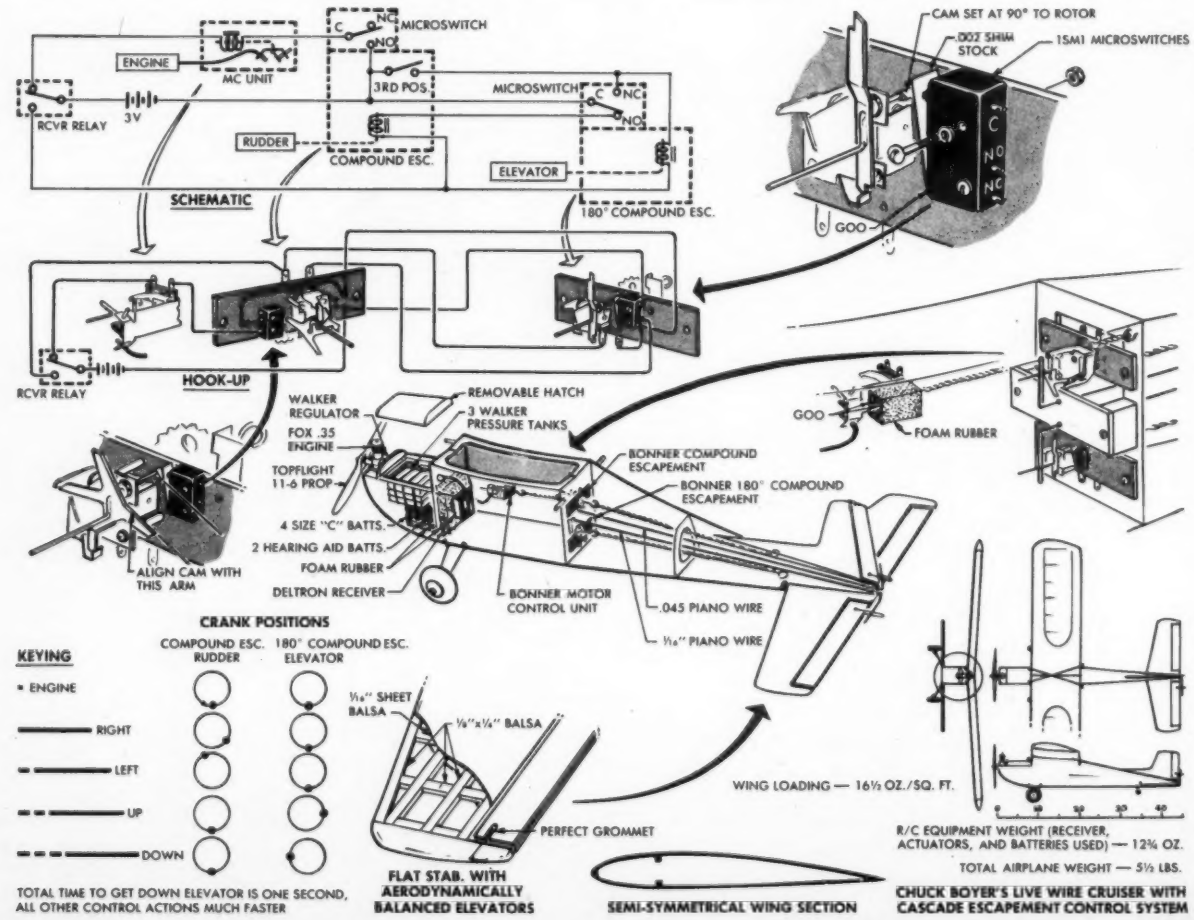
CASCADED ESCAPEMENTS

► Using a single-channel receiver to provide as many controls as possible has been a rapidly growing trend ever since Howard Bonner put the first compound escapement on the market in 1952. Recently, the term "Mickey Mouse" has come up from somewhere to describe any control system that obtains more than one control action from a single channel.

Until recently, the most advanced, operational Mickey Mouse system was the three-control system illustrated in the November '55 issue of MAN. While these systems are simple to rig and excellent for gaining experience, there is a disadvantage in that, whenever the elevator is used, the engine changes speed. Also, the elevator signal will only provide up and down-elevator, which means that the pilot often has to blip past an undesired control position or engine speed to get what he wants.

To provide the pilot with "what he wants when he wants it," various hook-ups for cascading compound escapements have been proposed and developed. To our knowledge the earliest actual flying with a cascade system was done by Vic Nelson (owner of Deltron Co.) in the summer of 1953. Since then modelers have worked out various versions of the system and in the last New York Mirror Meet, the cascade had (*Continued on page 37*)

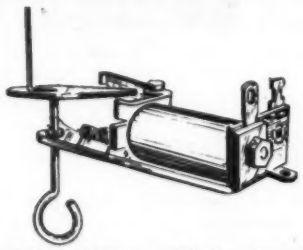
The 1955 Mirror Meet multi-event was won by Fran McElwee using an escapement system basically similar to Boyer's which is shown detailed below.



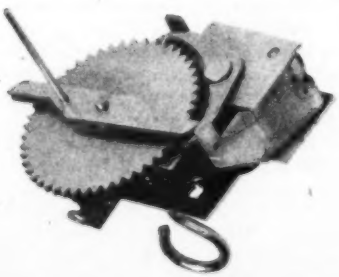
European pneumatic control system developed by Stegmaier of Germany, technical topics, club news, new items, make up fascinating report by Columnist, E. J. Lorenz.

CONTROL NEWS

Frank Schmidt's multi-control Cruiser made dozens of exhibition flights during that Canadian contest and won round after round of applause.



New escapement, Lafayette Radio, weighs less than ½ ounce, has low current drain when used with three volts. Biggest dimension is 1⅛ in.



Citizen-Ship SE compound-type escapement for single-control weighs less than one ounce, measures 1¼. Selective operation will help beginners.

Flying his famous ESKimo bipe, Ernie Kratzet took Forest City Flyers' second annual RC meet, London, Ontario. Also speed dash. Bramco radio.

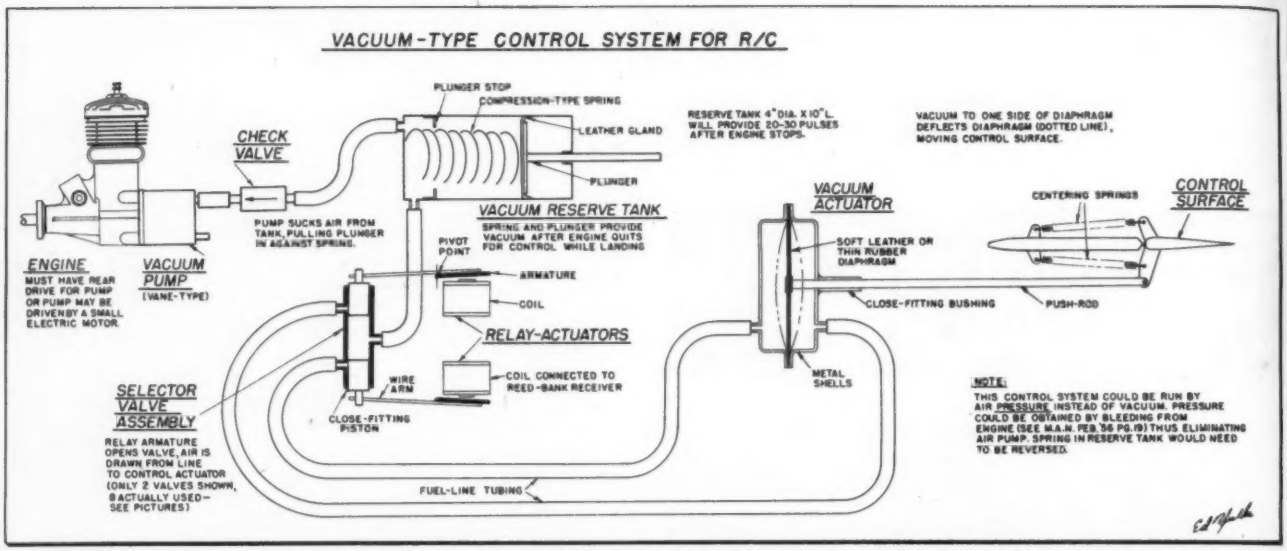
TECHNICAL TOPICS

► We have some very interesting items from overseas this month, but before going into them, we'll present a few views from around the good old U.S.A. The first one coming from Bob Drews, whom we mention again in Club News, concerns cleanliness of 465 mc transmitting antennas. He compares the efficiency of these antennas with a new vs. dirty and corroded TV receiver antenna. While we would recommend cleaning the antenna if it were muddy or grimy with oil, there would be no advantage in actually polishing it. The loss of efficiency encountered with an old TV antenna comes not from the fact that the elements are dirty, but that the mechanical joints, which in effect make electrical connections, have become corroded.

Harold deBolt of deBolt Model Engineering Co., P.O. Box 73, Williamsville, N.Y. has put out a sheet containing information on proper servo care. The greater part of the information on this sheet applies as well to other types of actuators, especially when they operate on low voltages. Some of the highlights direct: be sure the connecting pushrods and similar parts can move freely: do not bind or whip; be sure your relay is operating within specifications of manufacturer; avoid poor connections of excessive voltage drop through the connecting wires which allow extra resistance to "creep" into the circuit.

The first point is self-explanatory. The relay should be operated within the settings specified by the manufacturer in order to obtain the maximum current flow through the points with the minimum voltage drop. Be sure the points are clean at all times. Voltage drop because of poor connections or insufficient wire size is a major cause of maloperation and should be inexcusable. Make a mechanical joint at the point of connection before soldering. Use wire that is large enough to carry the current without producing an excessive voltage drop. No. 20 stranded wire is usually sufficient for most RC work. For example, an actuator has a resistance of 10 ohms and is connected to a 1½ volt power source. The voltage delivered to the actuator is 1⅛, if the resistance of the wire and connections is disregarded.

However, if 2 ohms more enter the circuit, the voltage


VACUUM-TYPE CONTROL SYSTEM FOR R/C
PLUNGER STOP
COMPRESSION-TYPE SPRING
LEATHER GLAND
PLUNGER
CHECK VALVE
PUMP SUCKS AIR FROM TANK, PULLING PLUNGER IN AGAINST SPRING.
VACUUM RESERVE TANK
SPRING AND PLUNGER PROVIDE VACUUM AFTER ENGINE QUITS FOR CONTROL WHILE LANDING
RESERVE TANK 4" DIA. X 10" L. WILL PROVIDE 20-30 PULSES AFTER ENGINE STOPS.
VACUUM TO ONE SIDE OF DIAPHRAGM DEFLECTS DIAPHRAGM (DOTTED LINE), MOVING CONTROL SURFACE.
VACUUM ACTUATOR
CENTERING SPRINGS
CONTROL SURFACE
SOFT LEATHER OR THIN RUBBER DIAPHRAGM
CLOSE-FITTING BUSHING
PUSH-ROD
ENGINE
MUST HAVE REAR DRIVE FOR PUMP OR PUMP MAY BE DRIVEN BY A SMALL ELECTRIC MOTOR.
VACUUM PUMP
(VANE-TYPE)
PIVOT POINT
ARMATURE
COIL
RELAY-ACTUATORS
COIL CONNECTED TO REED-BANK RECEIVER
WIRE ARM
CLOSE-FITTING PISTON
METAL SHELLS
SELECTOR VALVE ASSEMBLY
RELAY ARMATURE OPENS VALVE, AIR IS DRAWN FROM LINE TO CONTROL ACTUATOR (ONLY 2 VALVES SHOWN, 8 ACTUALLY USED—SEE PICTURES)
FUEL-LINE TUBING
NOTE:
THIS CONTROL SYSTEM COULD BE RUN BY AIR PRESSURE INSTEAD OF VACUUM. PRESSURE COULD BE OBTAINED BY BLEEDING FROM ENGINE (SEE M.A.N. FEB. '56 PG. 19) THUS ELIMINATING AIR PUMP. SPRING IN RESERVE TANK WOULD NEED TO BE REVERSED.

How the Stegmaier pneumatic actuator system operates. No batteries are required for actuators and control rod pull is greater than two pounds.

Radio Control News—Cont.

across the actuator will drop to only 1¼V, often a borderline condition. Check your battery voltages regularly to insure top performance from your equipment.

Earl F. Patric, Huntington Wildlife Forest, Newcomb, N.Y. reports that a very inexpensive antenna for our MOPA transmitter was purchased at the local hardware store. This consisted of a length of ⅜ dia. Reynolds aluminum rod, costing about $1. His search for a vibrator-type power supply ended at a local radio repairman's shop. It was fulfilled by junked car radios in which B supply voltages run as high as 330 and supply ample current for RC work. All that is needed to complete an otherwise "free" power supply is the addition of a 12 to 15W voltage divider *(Continued on page 45)*

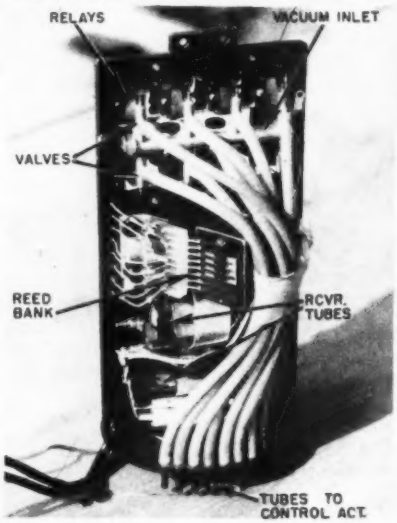


Photo A: This is the Stegmaier receiver and the reed bank—entire unit in a cylindrical can.

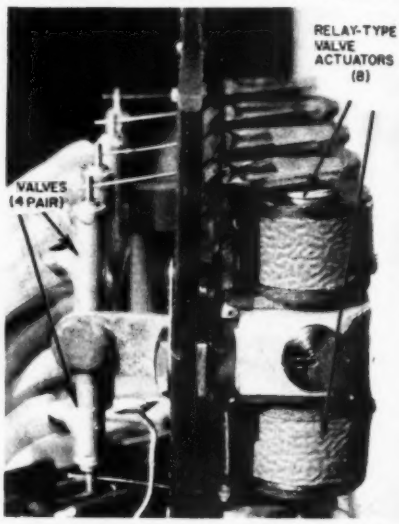
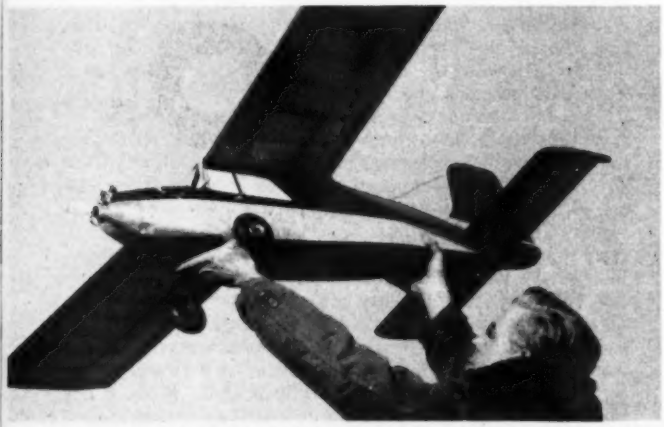


Photo B: The relays and air valves. The valves are operated directly by the relay armatures.

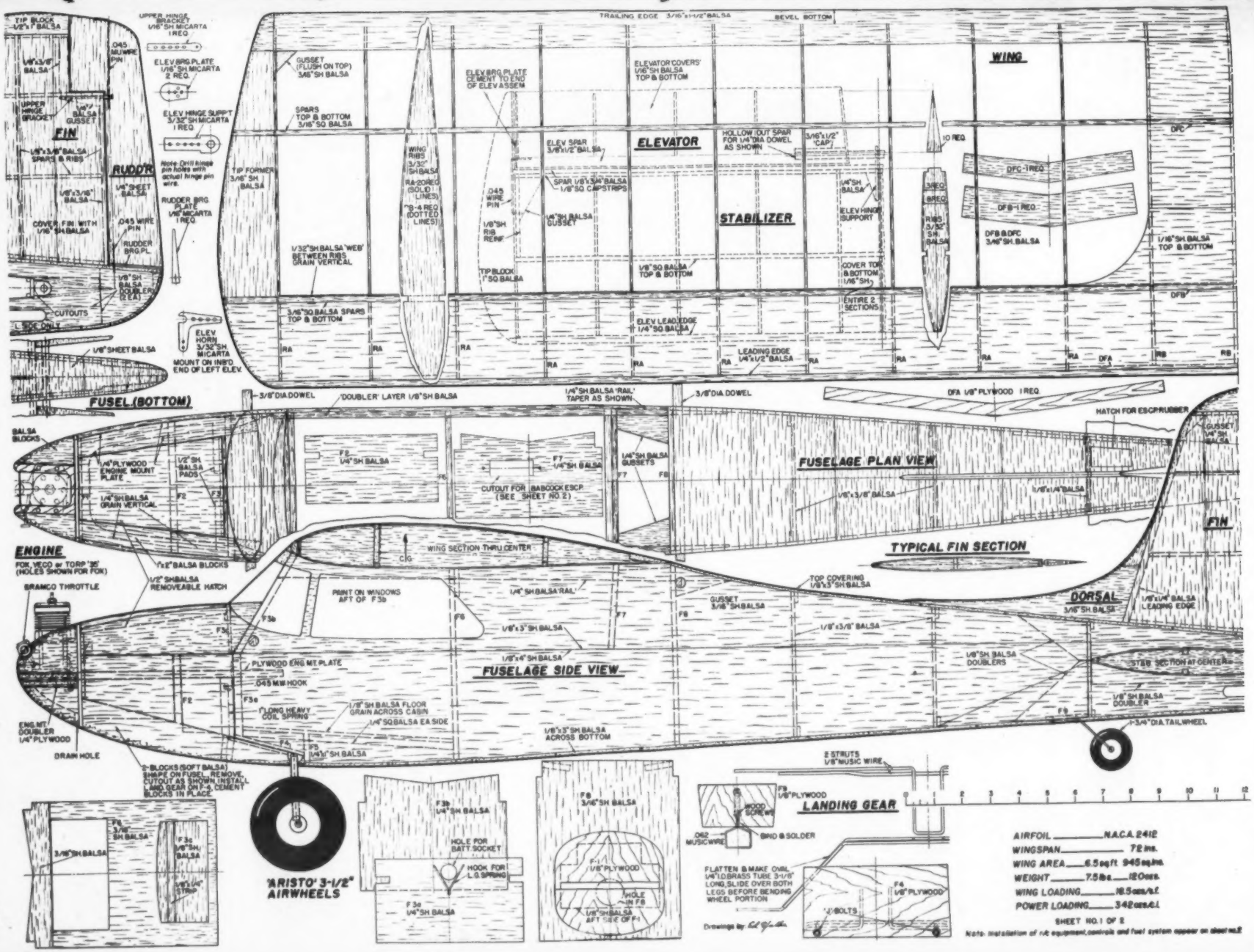
NOTES ON MULTI . . . Part Two



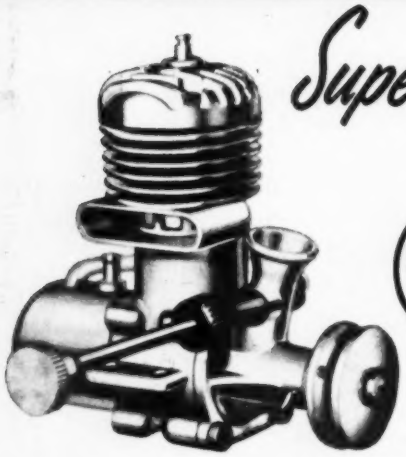
Picture shows the third of the series of test airplanes used for the experiments; plan, next page. Babcock system detailed in Part Three.

► Although the purpose of these articles was to record findings in multi-control, a by-product was three airplane designs. Third is of interest. Mark III has adequate area. Babcock three-channel receiver, Bonner trim-servo, Babcock compound for rudder, engine. Bramco throttle. NACA 2412 airfoil enhances maneuverability, helps ship stay where trimmed.

With Babcock, five intermediate batteries, K-45 B battery, weight, 7.5 lb.; wingloading, 18.5 oz.; powerloading, 342 oz. Plenty of power on .35. Fuel consumption high for rich-mixture low speeds: several Walker tanks needed. On Bramco throttle, two tanks placed in belly would be adequate. Battery complement is heaviest combination because of testing problems: could be lightened. Batteries behind firewall, receiver forward of CG, so be careful of changes. Rear fuselage, tail can be lightened for balance; actuators, etc., moved into forward half cabin if radio leaves room.

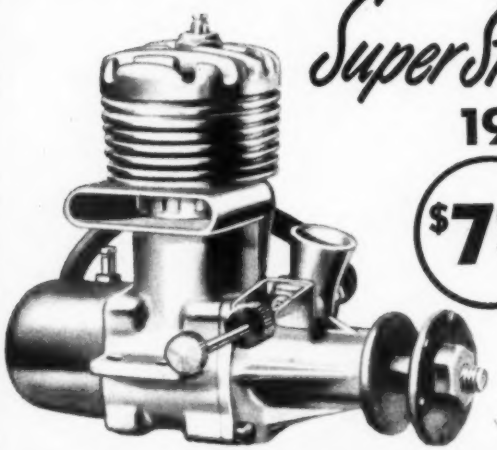

FIN
RUDDER
STABILIZER
ELEVATOR
WING
FUSEL (BOTTOM)
FUSELAGE PLAN VIEW
FUSELAGE SIDE VIEW
TYPICAL FIN SECTION
ENGINE
DORSAL
LANDING GEAR
"ARISTO" 3-1/2" AIRWHEELS
AIRFOIL N.A.C.A. 2412
WINGSPAN 72 ins.
WING AREA 6.5 sq.ft. 945 sq.ins.
WEIGHT 7.5 lbs. 120 ozs.
WING LOADING 18.5 ozs./s.f.
POWER LOADING 342 ozs./c.i.
SHEET NO. 1 OF 2

FAMOUS McC



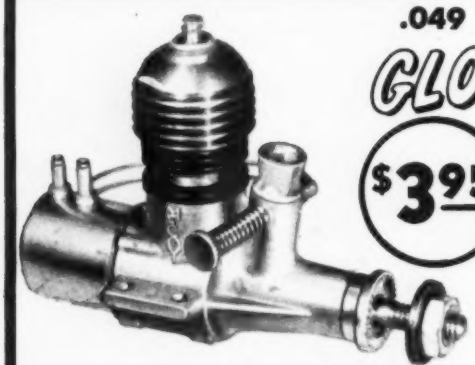
Super Stunt 9

$7.95



Super Stunt 19

$7.95



.049 GLO

$3.95

.049 DIESEL

$7.95

TESTOR CHEMICAL COMPANY • ROCK

DURO-MATIC PRODUCTS COMPANY DI

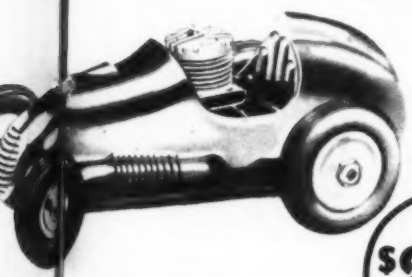
COY® PRODUCTS...

Super Stunt 29

$7.95

Super Stunt 36

$7.95

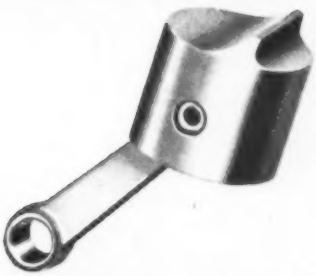


RACE CAR

$24.95

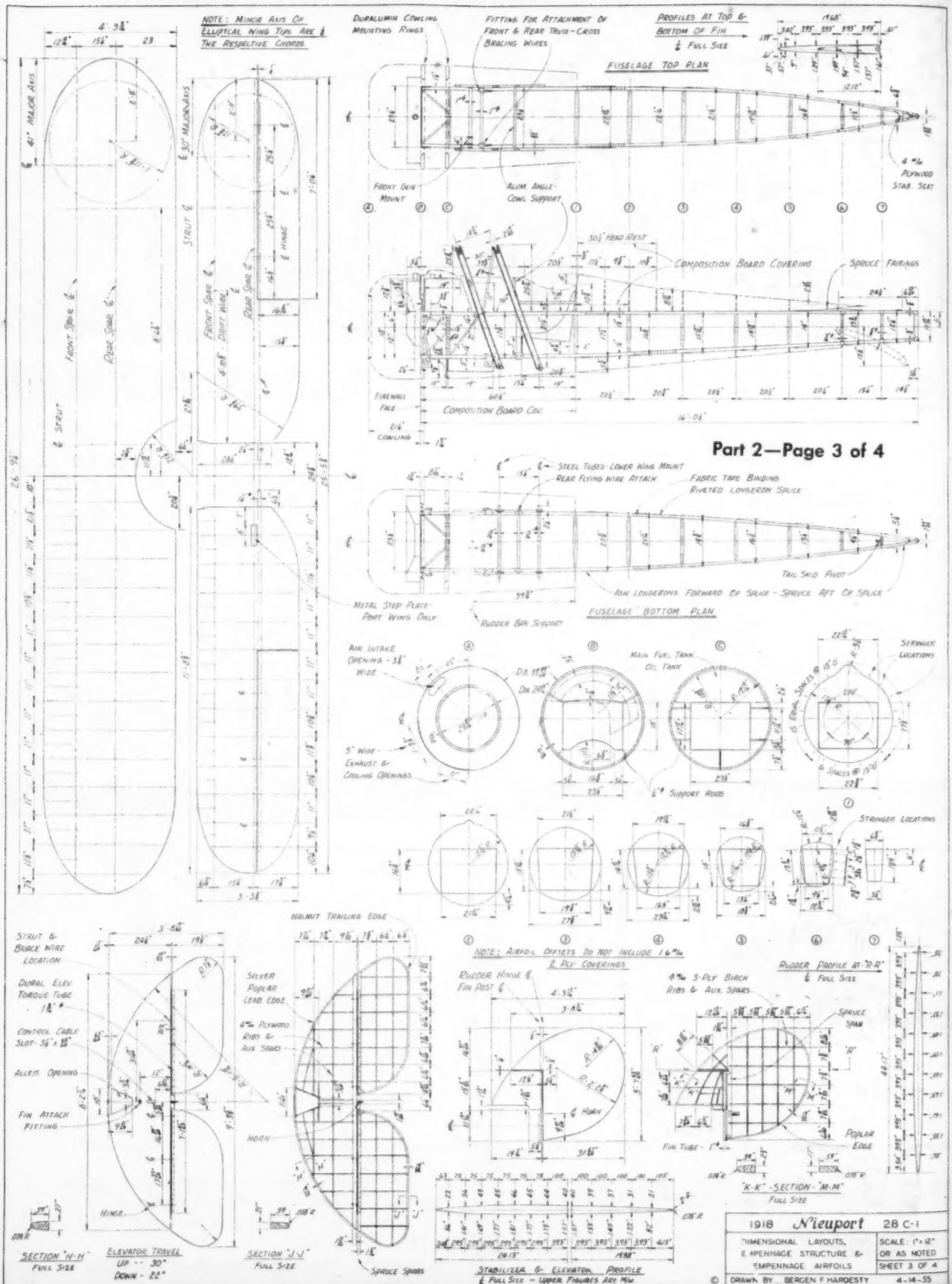
CKFORD, ILLINOIS

Y DIVISION



"Micro-Five" slug pistons—*"McCoy's Military Secret"*—in McCoy Super Stunt engines are machined and micro-finished to tolerances of 5 millionths of an inch—in both concentricity and size. This assures perfect fit of every McCoy piston and sleeve, interchangeability of parts, and minimum break-in. New fuel flow system gives 17-inch fuel draw for smooth, even running during stunt or combat maneuvers.

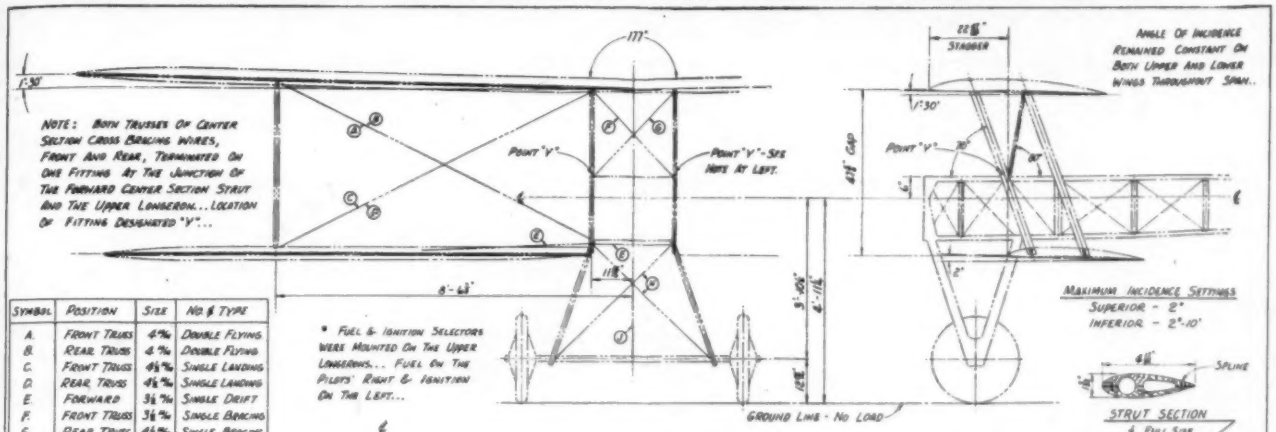
NIEUPORT 28—FRENCH FIGHTER FLOWN BY RICKENBACKER.


NOTE: MINOR AXIS OF ELLIPTICAL WING TIPS ARE ½ THE RESPECTIVE CHORDS
41" MAJOR AXIS
30" MAJOR AXIS
℄ STRUT
FRONT SPAR ℄
REAR SPAR ℄
FRONT SPAR ℄
DRIFT WIRE
REAR SPAR ℄
℄ HINGE
DURALUMIN COWLING MOUNTING RINGS
FITTING FOR ATTACHMENT OF FRONT & REAR TRUSS-CROSS BRACING WIRES
PROFILES AT TOP & BOTTOM OF FIN
½ FULL SIZE
FUSELAGE TOP PLAN
4 ㎜ PLYWOOD STAB. SEAT
FRONT GUN MOUNT
ALUM. ANGLE-COWL SUPPORT
30½" HEAD REST
COMPOSITION BOARD COVERING
SPRUCE FAIRINGS
FIREWALL FACE
COMPOSITION BOARD COV.
21½" COWLING
Part 2—Page 3 of 4
STEEL TUBES-LOWER WING MOUNT REAR FLYING WIRE ATTACH
FABRIC TAPE BINDING RIVETED LONGERON SPLICE
TAIL SKID PIVOT
ASH LONGERONS FORWARD OF SPLICE - SPRUCE AFT OF SPLICE
METAL STEP PLATE-PORT WING ONLY
RUDDER BAR SUPPORT
FUSELAGE BOTTOM PLAN
AIR INTAKE OPENING - 3½" WIDE
5" WIDE EXHAUST & COOLING OPENINGS
MAIN FUEL TANK OIL TANK
¼" SUPPORT RODS
STRINGER LOCATIONS
STRUT & BRACE WIRE LOCATION
DURAL ELEV. TORQUE TUBE - 1⅛"
CONTROL CABLE SLOT - 3½" x ⅝"
ACCESS OPENING
FIN ATTACH FITTING
HINGE
SECTION "H-H" FULL SIZE
ELEVATOR TRAVEL UP - 30° DOWN - 22°
WALNUT TRAILING EDGE
SILVER POPLAR LEAD. EDGE
4 ㎜ PLYWOOD RIBS & AUX. SPARS
HORN
SPRUCE SPARS
SECTION "J-J" FULL SIZE
NOTE: AIRFOIL OFFSETS DO NOT INCLUDE 1.6 ㎜ 2 PLY COVERINGS
RUDDER HINGE ℄ FIN POST ℄
℄ HORN
4 ㎜ 3-PLY BIRCH RIBS & AUX. SPARS
RUDDER PROFILE AT 70% R
½ FULL SIZE
SPRUCE SPAR
POPLAR EDGE
FIN TUBE - 1"
"K-K" SECTION "M-M"
FULL SIZE
STABILIZER & ELEVATOR PROFILE
½ FULL SIZE - UPPER FIGURES ARE ㎜

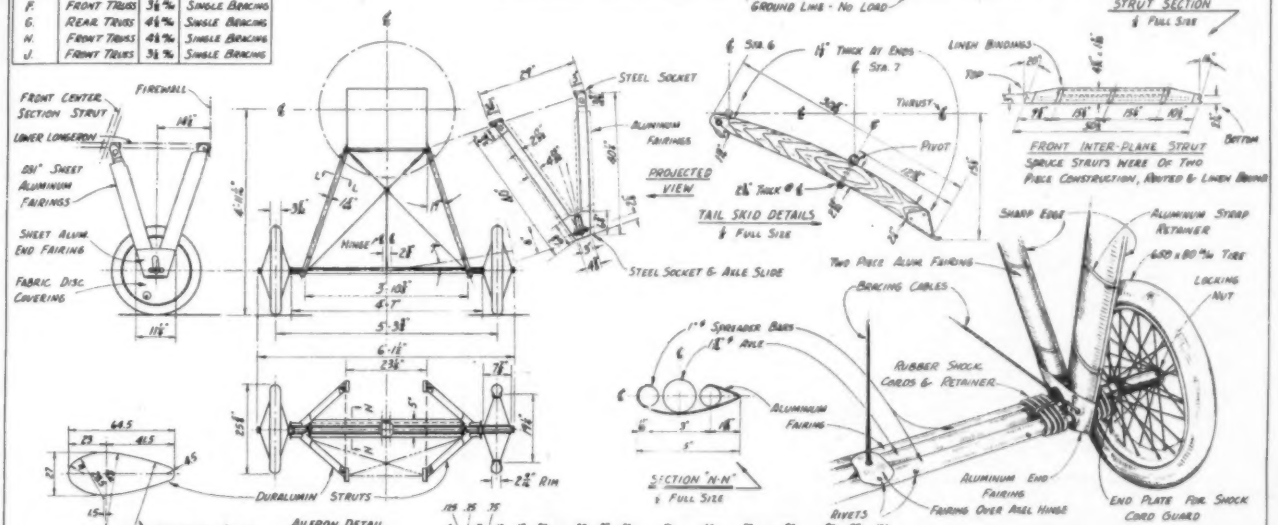
1918 Nieuport 28 C-1		
DIMENSIONAL LAYOUTS, EMPENNAGE STRUCTURE & EMPENNAGE AIRFOILS	SCALE: 1"=1' OR AS NOTED	
DRAWN BY BERGEN F HARDESTY	SHEET 3 OF 4	4-14-55

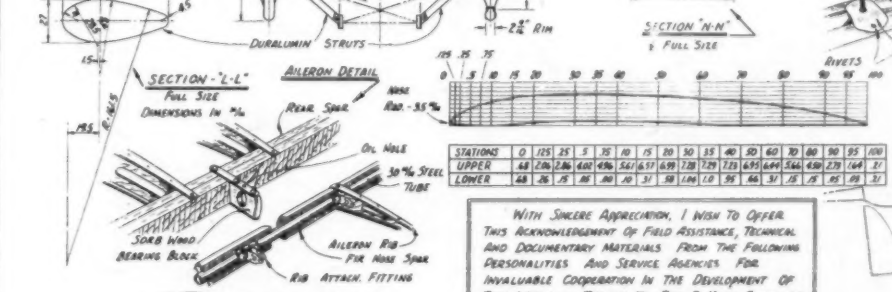
©

THESE DRAWINGS COMPLETE: A TWO-PART PRESENTATION.

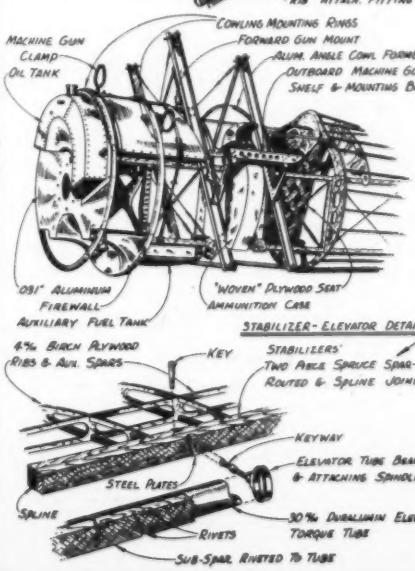

NOTE: BOTH TRUSSES OF CENTER SECTION CROSS BRACING WIRES, FRONT AND REAR, TERMINATED ON ONE FITTING AT THE JUNCTION OF THE FORWARD CENTER SECTION STRUT AND THE UPPER LONGERON... LOCATION OF FITTING DESIGNATED "V"...
POINT "V"
POINT "V" - SEE NOTE AT LEFT.
* FUEL & IGNITION SELECTORS WERE MOUNTED ON THE UPPER LONGERONS... FUEL ON THE PILOTS' RIGHT & IGNITION ON THE LEFT...
GROUND LINE - NO LOAD
STAGGER
ANGLE OF INCIDENCE REMAINED CONSTANT ON BOTH UPPER AND LOWER WINGS THROUGHOUT SPAN..
GAP
MAXIMUM INCIDENCE SETTINGS
SUPERIOR - 2°
INFERIOR - 2°-10'
SPLINE
STRUT SECTION
FULL SIZE

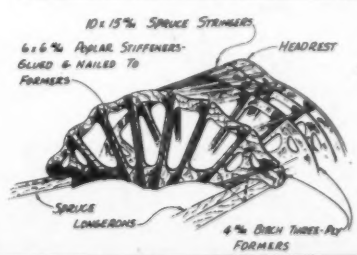
SYMBOL	POSITION	SIZE	NO. & TYPE
A.	FRONT TRUSS	4⅞	DOUBLE FLYING
B.	REAR TRUSS	4⅞	DOUBLE FLYING
C.	FRONT TRUSS	4⅛	SINGLE LANDING
D.	REAR TRUSS	4⅛	SINGLE LANDING
E.	FORWARD	3⅛	SINGLE DRIFT
F.	FRONT TRUSS	3⅛	SINGLE BRACING
G.	REAR TRUSS	4⅛	SINGLE BRACING
H.	FRONT TRUSS	4⅛	SINGLE BRACING
J.	FRONT TRUSS	3⅛	SINGLE BRACING





STATIONS	0	.125	.25	.5	.75	1.0	1.5	2.0	3.0	3.5	4.0	5.0	6.0	7.0	8.0	9.0	9.5	10.0
UPPER	4.8	2.06	2.86	4.02	4.96	5.61	6.57	6.99	7.28	7.29	7.26	6.95	6.44	5.66	4.58	2.79	1.64	.31
LOWER	4.8	.26	.75	.85	.90	.90	.51	.38	1.06	1.0	.95	.66	.51	.15	.15	.05	.05	.31

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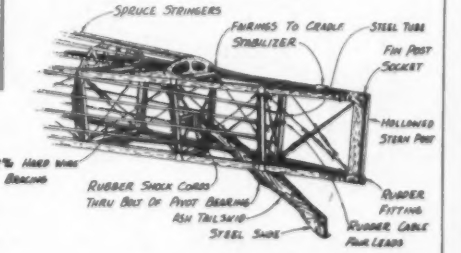

WITH SINCERE APPRECIATION, I WISH TO OFFER THIS ACKNOWLEDGEMENT OF FIELD ASSISTANCE, TECHNICAL AND DOCUMENTARY MATERIALS FROM THE FOLLOWING PERSONALITIES AND SERVICE AGENCIES FOR INVALUABLE COOPERATION IN THE DEVELOPMENT OF THIS WORK... THANKS TO PAUL R. MATT, CINCINNATI, OHIO, LEWIS WOOD AND "NED" KENSINGER OF PEORIA, ILL., FOR HELP IN THE FIELD SURVEY. TO CAPTAIN "EDDIE" RICKENBACKER AND PETER BOWERS, CREDIT IS DUE FOR DATA OF MARKINGS AND INSIGNIAS. THANKS TO LENORE D. FALKNER, WRIGHT-PATTERSON AIR FORCE MUSEUM, ALBERT F. SIMPSON, USAF HISTORICAL DIVISION, ROBERT C. STROBELL, NATIONAL AIR MUSEUM, M. CHARLES DOLFUSS, MUSEE DE L'AIR, PARIS, FRANCE AND ROBERT E. RUST, ATLANTA, GA. FOR TECHNICAL DATA... THANKS ALSO, TO THE MANY COLLECTORS AND AVIATION ENTHUSIASTS, E.W. ROBISCHON, I.A.S., JOSEPH NIETO, GEORGE HARDIE JR. AND DAVID WILLIAMS FOR INTEREST IN THIS PROJECT.

Bergen Hardesty

DIMENSIONS & STRUCTURAL DATA FOR THESE DRAWINGS WERE OBTAINED FROM REMNANTS OF A NIEUPORT 28.... DETAILS & DIMENSIONS OF THE EMPENNAGE WERE TAKEN FROM ORIGINAL FACTORY DRAWINGS....

Part 2—Page 4 of 4

1918 Nieuport 28 C-1	
LANDING GEAR LAYOUT, PLAN OF RIGGING, SECTIONS AND CONSTRUCTION NOTES	SCALE: 1"=0" OR AS NOTED
DRAWN BY... BERGEN F. HARDESTY ... 4-14-88	SHEET 4 OF 4

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If you keep a scrap box, all you need is cement to finish this model! Sandpaper for smoothing.

tiny tandem

By PAUL E. DEL GATTO

Sugar and spice, and everything nice, that's what little gliders are made of . . .

► Here's a slick-performance glider which comes in a mighty small, but nice, package. Even the non-expert model builder can construct one in about three hours, even to putting on a good finish.

The design itself offers some surprises in the relative proportions of surfaces and the moderate use of negative dihedral. The stabilizing surface is over 50 per cent of the wing area, thus placing the design in the tandem classification.

Flight presents some interesting characteristics. To begin with, the altitude obtained was a little less than might be possible to a conventional glider with approximately the same total area, but the glide appeared to be equally good.

In the model's favor is excellent recovery and ease of adjustment for optimum performance by someone with a relatively poor throwing arm.

As a rule we favor small stabilizing surfaces, but this design proves the value of large stabilizing surfaces with their compensating characteristics.

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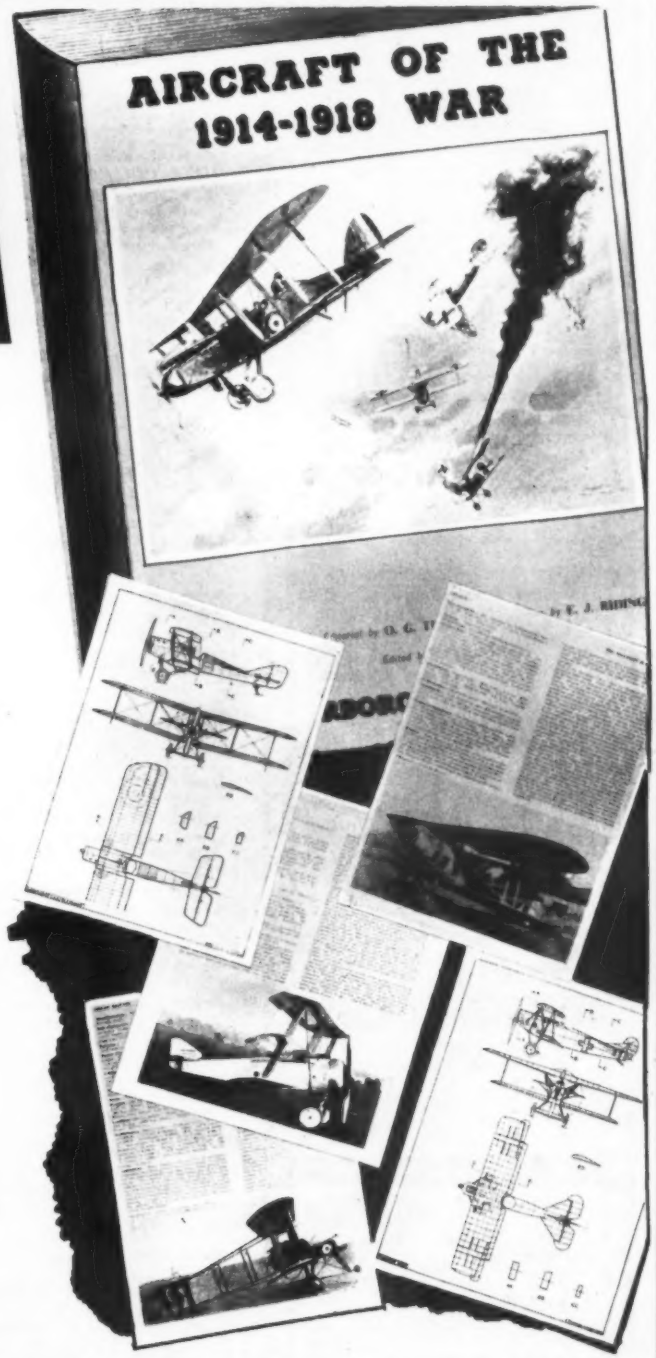
AIRCRAFT OF THE 1914-1918 WAR



CONTENTS

(1) Eighty aircraft flown by the nations involved in the 1914-1918 War are each described with a large photograph and full-page set of 1/72 scale 3-view drawings together with wing section and three fuselage sections. Also given are full dimensions, weights, armament, performance, power plant, load and constructional details; together with information as to the squadrons to which each aircraft was issued plus the aircraft's "Operational History."

IN ADDITION

(2) A further 24 interesting aircraft are described with a large photograph with full particulars as to dimensions, weight, armament, performance, etc. As with the first 80 aircraft, information is also given as to the squadrons to which these aircraft were issued. there are photographs (only) of a further 94 British, German and French aircraft. All these are "experimental and rare types."

FINALLY

(3) Finally, there are 14 large photographs showing line-ups of British, French, German, Belgian and Italian squadrons, in which many famous insignia and squadron markings are clearly illustrated.

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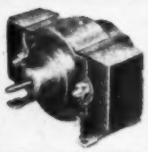

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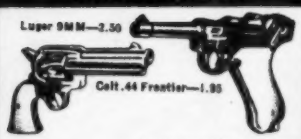

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FOREIGN NOTES

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P. G. F. CHINN

Western Germany

► The Johannes Graupner people, leading German RC manufacturers, have added an interesting new receiver to their Standard range. Developed from the Standard 10, this new Series II receiver has the addition of a "magic eye" tube for ease of tuning. These sets will operate on a 30-volt B supply and it is claimed that a current drop of 4 to 5 ma is obtained, which is pushed up to 8 to 10 ma on 60V. Weight is 3¾ oz. and a single seven-pin plug is used to make connection to batteries and escapement, permitting easy removal of receiver for servicing. The set is assembled in a sandwich layout, main components (tubes, relay, for example) being mounted on top, with wiring, condensers, resistors, etc., between two bottom plates. Minor modifications have also been made to the Standard 10 transmitter which now uses a glow lamp in lieu of the meter fitted to the Series I units.

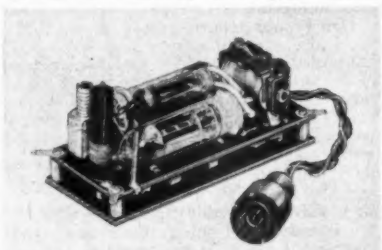
Italy

We are getting an increasing number of inquiries, from users of racing .60's, for foreign-built engines, now that few motors of this displacement are available on the American market. The big displacement racing unit has never been a favorite production item with overseas manufacturers and the choice of such motors is severely limited. One of the best, however, is the Italian Super-Tigre G.24.

This is a short-stroke motor, having a bore of .9842 in. (25 mm) and stroke of .7874 in. (20 mm), giving a displacement of .599 cu. in. It uses a rear drum, or sleeve, rotary-valve (similar to the Atwood Champion, Contestor D.60R and some models of the Fox .59), but otherwise follows accepted racing engine practice, including one-piece crankcase-cylinder-block casting with inserted iron liner, flanged front and rear covers, each attached with four screws, twin ball-bearing mounted shaft and lightweight aluminum piston with two rings. The large volume intake is steeply raked in order to give a smoother passage to the incoming charge and the plug in offset in the six-stud head. Output claimed is 1.40 bhp at 17,000 rpm. We suggest inquiries for this motor be directed to the American importers: World Engines of P.O. Box 905, Warren, Ohio.

England

Wilmot, Mansour & Co., Ltd., well known as the manufacturers of Jetex motors and who also market a line of unique and highly successful jet scale flying models, are once again leading off with a new line in Europe: "hollow solid models." Known as Wimco Hollows, these are inexpensive 1/44 scale molels, the first three being the Gloster Javelin, English-Electric Canberra and Vickers Valiant. All parts are molded in .025 Styrene sheet and are ready for assembly and each kit includes an accurate three-view drawing and a sheet of decals. We found the parts to be accurately made and. of course, the smooth, matt gray surface finish forms an excellent base for enamels or polystyrene paints.

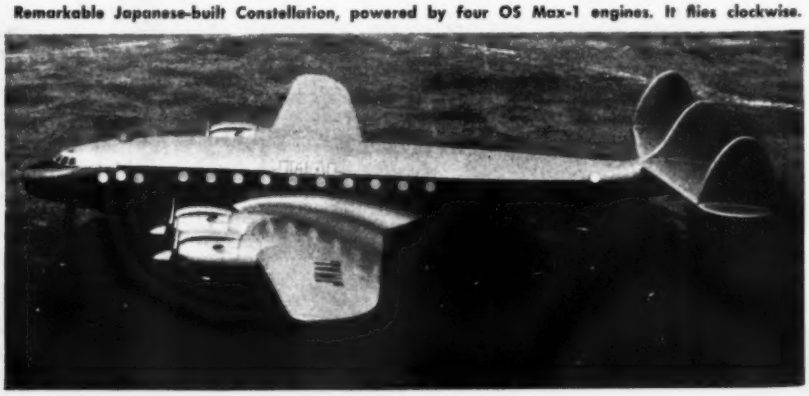


German Standard 10 Series II receiver with magic eye tuning, 3 tubes. Made by Graupner.

India

In a previous issue we had cause to comment favorably on the efforts of the All-India Aeromodellers Assn. Despite its large population, India has, as yet, only a small model movement, but the AIAA is doing its best to popularize the hobby. Fortunately (and unlike many other countries in which restrictions on the movement of foreign currency prevents the importation of modeling items), India is able to obtain material and equipment from other countries, although cost can be a serious deterrent, particularly in regard to RC items. At present, there is

Remarkable Japanese-built Constellation, powered by four OS Max-1 engines. It flies clockwise.



Tony Alvarado, from Havana, and one that got away. Neat Nordic features small stab, a trend.

only a handful of active RC enthusiasts in India and, apart from the cost barrier mentioned, Mr. K. L. Roy, Chairman of the AIAA, reports that many imported RC transmitters and receivers are somewhat unreliable because of climatic differences between India and the countries of manufacture. Are all manufacturers aware of the need to tropicalize some exported equipment, we wonder?

Czechoslovakia

One of our reporters in Czechoslovakia has sent us some drawings of a new racing .29 built there and called the Z-5. In view of the outstanding performances set up at the 1955 World Championships speed event by the special Czech motors developed by the Sladky-Husicka-Koci group, anything in the motor line from that country seems worth investigating and the Z-5 is an interesting looking design, although certain features would not, we imagine, add up to the performance claimed. It has a displacement of .298 cu. in. and an exceptionally short stroke of only 15 mm (.59055 in.), the bore being 20.35 mm (.80118 in.) so that the stroke-bore ratio (.737:1) is actually slightly less than that of the Dooling .29. It has a disc-type rotary admission valve with inclined rear intake and twin ball bearing mounted shaft but, beyond these features, shows little further resemblance to the stock racing .29 layout. The cylinder porting, for example, is radial, the exhaust being ducted into twin stacks, yet, strangely enough, the glow plug is offset to one side. According to the power curve supplied, a maximum output of .65 bhp at 15,000 rpm is claimed, using a 20 per cent nitro content fuel.

Australia

We have recollections of a bunch of enthusiasts on the West Coast who, about four or five years ago, flew Class C-D team racers, but, as far as we know, Australia is the only place where an outsize team race class is officially recognized. Briefly, the Australian rules call for a 230 sq. in. wing, 2 oz. tank, 70 ft. lines and 120 laps. Some builders favor big .60's and .65's running on gas-oil for economy; others use a lighter ship and .31-.35 motors on alcohol fuel, getting similar performance. In the NMAA Championships, Arthur Gorrie flew a K & B .32-powered model, 300 sq. in., Mi-T 9 x 7 prop, clocking 8:45 for the 10 miles including two pit stops.

Eastern Germany

Following a good deal of apparently well-merited criticism, engine makers in the Communist Deutsche Demokratische Republik are now coming up with one or two more hopeful designs. For example, the Zeiss (*Continued on page 53*)

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Hi-Fli

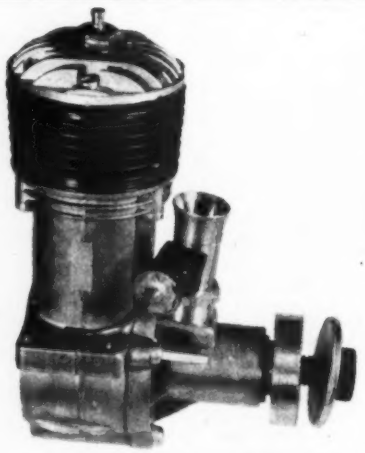
(*Continued from page* 10)

is a lighter, cleaner VTO version of the earlier FAI design and achieved high time in both the regional FAI eliminations and Southern California finals. Construction is simple and strong. Wing and tail should be completed first. Be careful to select the grades of wood indicated on the plans. The original was covered with lightweight silk, but Japanese tissue is recommended for its lighter weight and greater rigidity.

In constructing the fuselage, build the nose section first as shown in Figs. 1, 2 and 3. Motor bearer spacing will, of course, depend on the engine used. Trace the fuselage sides directly from the plans, marking the position of all bulkheads, etc., on the balsa. Pin and cement the longerons to the sides and add sheet filler at the rear. The pylon is constructed over the plan and, when dry, trimmed to a streamlined section and planked with 1/32 in. sheet balsa. Add wire hooks and wing platform at this time.

With the exception of the top and bottom planking, the fuselage is completely assembled flat on the workbench. Drill a hole in the work surface to clear tank outlet and pin left side of fuselage down flat near the edge of surface to allow the wing rest to project over edge. Prop up rear end as necessary and bevel as shown on top view of rear section. Cement the nose section in place, add all bulkheads and cement and pin—or weight—right side of fuselage directly over left. Cement completed pylon assembly in place, measuring to ascertain correct angle of attack. Add sub fin and plywood skid to completed assembly. Allow fuselage to dry overnight on workbench; remove and plank top and bottom cross-grain. Round off nose section as shown in pictures and sand corners of fuselage to a radius of approximately ¼ in.

The Austin Timer and DE shut-off form a very reliable engine shut-off system. Drill out the rivets holding the fiber-covered plate on the large Austin Timer and, using the old cover as a template, make a new one from 1/32 in. aluminum, allowing a projection to hold the bolts for the DE shut-off. Tin stock drilled 3/16 in. to slip over side outlet on DE is bent around it to form a mounting strap. The assembly is clearly shown in picture. Cement complete unit into the fuselage and be sure the nuts holding cover plate screws are secure. When cement has dried,



ENGINE REVIEW

FORSTER .35

For years this firm offered top quality—.35 no exception!

By E. C. MARTIN

► Perhaps the best examples of continuity in engine appearance in production today, the Forster .29 and .35 engines, have changed but little in general looks from their ancestors of the thirties. In an era where quality and value for money seems to improve with every new production, the Forsters remain as they began—top quality throughout and always offering those little extra refinements that gladden the heart of the true enthusiast.

Undoubtedly the most interesting development in the current Forsters, and one which will impress every manufacturer, is the cast iron piston. This excellent piece of work is an actual casting incorporating the correctly contoured baffle and wrist pin bearing supports normally only seen on ringed aluminum pistons and consequently offering most of the advantages of both types of piston.

Wrist pin retention, always a delight in Forster engines, is now accomplished by snap rings around the pin on the inside of the piston, instead of in grooves in the piston at the ends of the wrist pin. This results in a slightly lighter piston, but complicates assembly, as extreme care and patience are required when fitting or removing the snap rings.

As always, the Forster die castings are excellent with no visible flaws or cold rolls and all strengthening webs and fins are clean cut with no die extraction marks. Especially pleasing is the way in which all the major components are accurately alined with no overlapping flanges.

A feature of the Forster that is fast becoming a rarity is the fabricated crankshaft. This type of shaft was once almost universal, but has dropped out of favor on account of cost. Since most model crankshafts are machined from rolled bar stock, the grain flow of the material runs along the axis of the shaft; consequently, the weakest part of the shaft will be the crank web or disc because the major stress is at right angles to the direction of grainflow and exerts a bending moment. To overcome this disadvantage, it is usual to make the web a little thicker than would otherwise be necessary, or be really clever and use a forged shaft, as in the Arden engines of yesteryear, which had a grain structure (*Continued on page* 40)

the complete cover plate, plunger and shut-off assembly are removable for occasional cleaning and lubrication with vasoline, which insure reliable operation of the unit.

Prior to test flying, check surfaces and remove any warps by running hot water over the surface and twisting contrary to the warp. Key wing and stab carefully in proper alinement by cementing ⅛ x 1/16 x ⅜ in. hardwood strips on the underside of wing and stab next to the four corners of their respective platforms. The sub-fin should be offset slightly to the left and the stab tilted up on the left side for a left glide pattern. By this I mean that the LE should be offset to the right for a left rudder effect. This produces a leverage effect that prevents over-banking in the right spiral climb. If the fin is offset in the other direction, the ship will be very difficult, if not impossible, to adjust. Place a straight edge along the stab platform and underneath the wing rest. The LE of the wing should be exactly 5/32 in. higher than the TE. Balance as shown on plans and make sure engine has no offsets.

If the Hi-Fli is carefully constructed and trimmed as specified, no adjustments will be needed. Trim with tab as needed for a wide right spiral climb and adjust glide turn by varying stab tilt. Definitely do not use thrust adjustments or wing warps. Slight incidence trim at stab may be needed to vary the steepness of climb. Glide trim is achieved by balance only. The Hi-Fli will prove to be a very safe, easy aircraft to fly. Even under extreme power and speed, it is absolutely safe and generous with "pilot errors."

Always launch with the wing at your back for VTO. As to selection of engines, most .15's and .19's can be easily mounted between the beam mounts but much of the success of the FAI size depends on the tremendous power and absolute reliability of the Webra Mach-I Diesel.

Cascaded Escapements

(*Continued from page 24*)

its most important victory when Fran McElwee used it to win first place when competing against multi-channel airplanes. Chuck Boyer rigged the cascade system shown shortly after the last Nationals and has won first place at three Larks contests and second place in three others to win the big Larks' trophy permanently. He's proudest, though, of having gotten a fourth place at Turloc, Calif. last year, right behind Alex Schneider, Bill Deans and Dale Root, but ahead of five well-flying multi-channel airplanes.

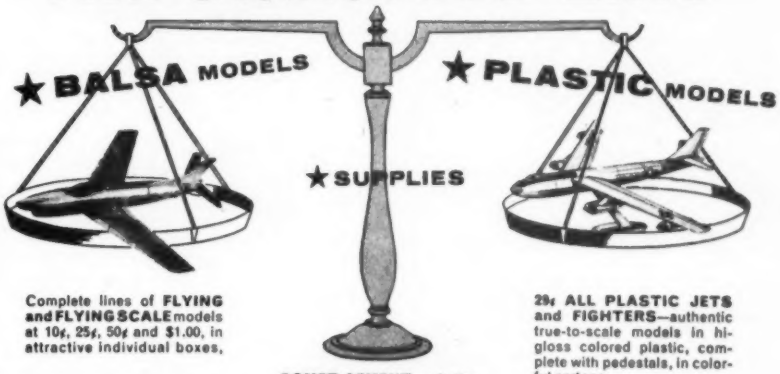
In theory, the cascade appears to be the ultimate in single-channel RC and in lightweight control systems (though in RC it's not safe to call anything the ultimate because progress never stops). The light weight of a cascade system makes it possible to go to smaller airplanes or to use lots of Fibreglas and other "insurance" measures. Chuck uses larger batteries than the minimum for longer life (with steady week-end flying he changes B's every three months; the A's, once a month). But many of the West Coast gang are using Eveready 505's and sub-miniature pencells with their Deltrons, which would make for a total RC installation weight of less than 9 oz. for a Cascade system.

The drawings show most of the tricks Chuck used in his airplane. The cams are made from 3/32 brass tubing which is slightly flattened and split so it can be soldered onto the escapement shaft. Soldering must be done with extreme caution so that the rotor or speed wheel does not work loose. "Goo" is an adhesive

(*Continued on page 40*)

COMET

The BALANCED Line



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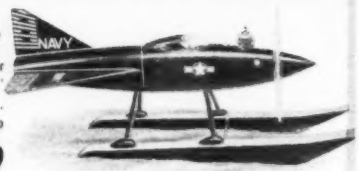

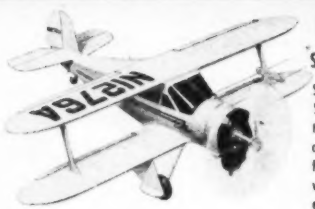

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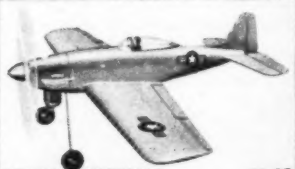

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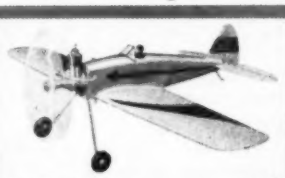

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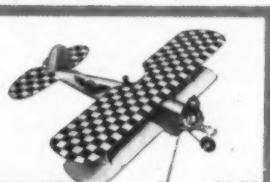

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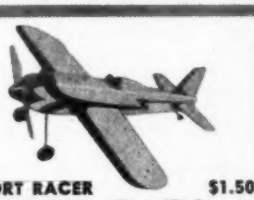

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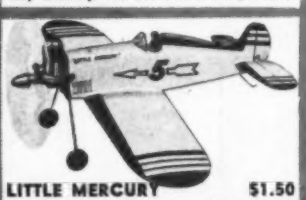

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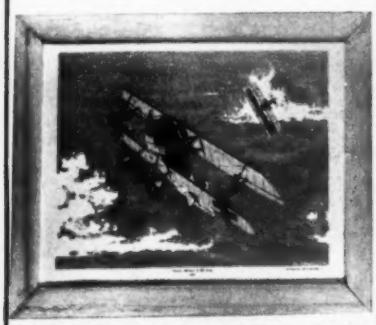
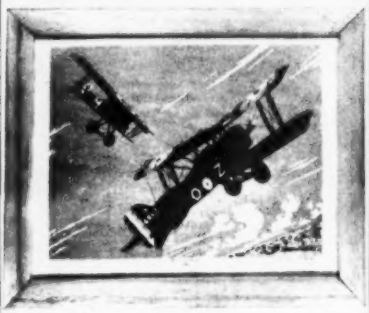
PAINTINGS

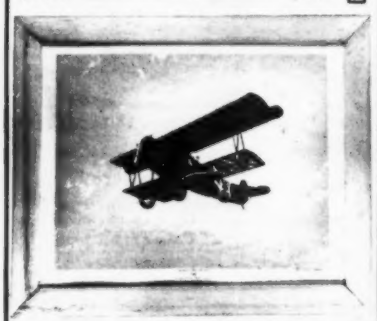
World War 1 Aircraft In Full Color



Painting No. 1—Shows **GERMAN ALBATROS** being attacked by British Sopwith Pup. All in full battle color, grey, red, brown, etc. against blue, white fleeced sky. All strut and rigging wires shown in full detail. Beautiful for your Living Room or Den. **LARGE** size 17" x 14" with white border ..... $3.98 ☐



Painting No. 2—Shows **BRITISH S.E. 5** of No. 85 Royal Air Force Squadron being attacked by German Fokker D-7. The S.E. 5 in olive and all Squadron markings, etc. the D-7 in full camouflage pattern colors. This is simply full of color, very outstanding. **LARGE** size 17" x 14" with white border ..... $3.98 ☐



Painting No. 3—Shows **GERMAN FOKKER D-7** in a brilliant scarlet against a light blue and white sky. All markings, rigging, etc. as it shown flying, looking for prey. One of the most famous of WW 1 Aircraft and was featured in old photoplay "Hells Angels" **LARGE** size 17" x 14" with white border ..... $3.98 ☐

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used by model railroaders, and Chuck not only uses it to attach the brass shim stock cam followers but also on every nut and bolt throughout his installation, which is one of the reasons he can keep flying all day. Another point he believes in is soldering up a battery pack, instead of using boxes. Throughout all his airplanes appear the little functional touches which add to ruggedness and reliability. His elevators are made from two sheets of 1/16 balsa with the same stock running cross-wise every two inches. There is a certain amount of springiness in the control system (note the wire torque rods) so that control response will be about the same whether the airplane is flying at high speed or low speed.

Chuck keeps his RC activities mainly to flying, with little building and fussing, by keeping everything simple and rugged.

Frank C. Dazey

Supermarine Sparrow

(*Continued from page* 20)

holes in fuselage for the wires. These wires are nylon thread attached inside to Former 3 with rubber bands for allowance of movement of elevators and rudder. The dummy motor is made of scrap wood and paper; the engine cowling, of ½ in. sheet.

Only the finishing touches remain now. The color scheme of the original model was silver wings and tail; dark blue fuselage with black number of wing and black number with white background on fuselage; where brass is used on landing gear, paint silver.

Cover wing and tail with tissue and five coats of dope, all dope being thinned 50 per cent. Three coats of Sanding Sealer then go on fuselage which is covered with white tissue. Wings and tail had Testor's silver nitrate dope, while the body carried dark blue nitrate dope. One coat of clear Butyrate was sprayed over the entire plane. Finally, the entire airplane was covered with white Japanese tissue with six coats of clear nitrate dope.

Before flying, check to see if the CG is about 50 per cent; glide the plane left and power it with right and downthrust.

Engine Review

(*Continued from page* 36)

that goes round the corners in the shaft. A fair compromise is the built-up shaft with separate mainshaft, web and crankpin as seen in the remarkable Dooling .61, but it is important with this type to have adequate web thickness for a safe secure press fit, and a small engine may not conveniently fit this requirement where a .60 will. The Forster employs a shaft and web machined from bar stock with a press fitted crankpin, the unit being finish-ground after assembly to insure alinement. Grain structure in that case is not ideal and a fairly heavy web is employed; however, since all these different types of shaft do their job satisfactorily, the whole thing is really a metallurgist's fad that is invariably settled by production cost. But we still like forged shafts.

It is the usual practice with engines having a steel cylinder with integral fins and a joint flange at the port belt to hold the head, cylinder and crankcase together with long tie bolts screwing into tapped holes in the crankcase. Unquestionably, this system works satisfactorily and is economical to produce. Nevertheless, the Forster system has certain advantages over the tie bolt system. The greatest is that all bolts screw into tapped holes in the cylinder flanges, which, being steel, greatly reduce the possibility of stripping threads. Some may feel, however, that this is off-

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Drawn by MODEL AIRPLANE NEWS' William Wylam. These drawings consist of four ¼ inch to the foot plans—double the size of the Ford drawings in the May and June issues. Two plates show side view and cabin details, two more the dimensional layout and front view details. Complete set $1, postpaid.

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set by the fact that the heads of the inverted cylinder retaining screw are not easily accessible unless the main bearing housing is first removed. All will agree that it makes a very neat assembly.

A worthy addition to this new front rotary Forster, apart from the extra cubic inches, is a removable venturi restrictor retained in the conventional manner by the spraybar. The reduction in diameter is only about .040 but it gave 2 in. more fuel lift than the straight intake and reduces power only very slightly.

Forster engines have always featured a small drill hole in the intake just above the spraybar and, apart from the safeguard it provides against flooding too easily, it brings to mind the fact that fuel will not burn without air. Because of this hole it is possible to start the engine and choke it at the same time, since sufficient air can get in to support combustion.

In all other respects this new Forster is similar to the front rotary .29 and seems to have extra power in proportion to the larger displacement. Unlike many designs which have simply had their bores increased, the Forster .35 still runs very smoothly and ranks among the finest engines available. The example tested was an early model which had a paper gasket at the crankcase-cylinder joint flange and at the advice of the factory this was removed, as it had been found to be the cause of slight cylinder distortion. Both surfaces were well finished and no crankcase compression leakage resulted.

Report on Germany

(*Continued from page* 18)

effective rudder area will not all be lost during tow. Nordic wings are in halves, plugging onto tongues mounted in fuselage sides, providing maximum shock absorption, not only upon impact, but in the tow. The flexing of the wing tongue on Hacklinger's glider increased his dihedral angle 50 per cent during a tow into the wind. One of the accompanying pictures shows the sweep-forward being tried by some builders as a means of eliminating the slight washout necessary for highest wing efficiency. A number of Germans used simple V-dihedral rather than tip dihedral or polyhedral. Airfoils are considerably thinner than those seen on U.S. gliders. In almost all Nordics, some device is used to provide turbulence along the upper camber of the wing; Hacklinger, Rechenberg and others used a nylon turbulator suspended before the LE, some utilized wing sections which assured turbulence, nylon or string was glued near the LE and the most original method was a step-like arrangement of the LE sheeting on Naegele's successful model, which was in first position through the fourth round. Overly shiny finishes on the upper surfaces of wings are taboo because this too much decreases turbulence.

The one design of which a few copies were seen was Lindner's 1954 Internationals winner; only one "old style" Nordic with built-up fuselage and swept-back wings was found among the eliminations winners. In summary, successful Nordics in Germany utilize balsa in construction to an extensive degree, higher aspect ratios and thinner, more cambered, airfoils than most U.S. builders, and are on the verge of the development of a single model which will achieve maximum performance in calm or windy conditions through modification of trim.

The Germans consider Gustav Samaan and Wakefield as synonymous terms and everyone at Brunswick felt that Samaan

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GARY CHRISTIANSEN, Utah, *nearly doubled* the existing national record in class "C" Open Free Flight. Last August at Twin Falls, Idaho, his "Royono" using a 10/6 TOP FLITE set a great new mark of 53 minutes, 28 seconds, officially approved by the Academy of Model Aeronautics.

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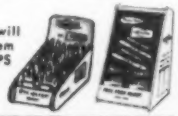

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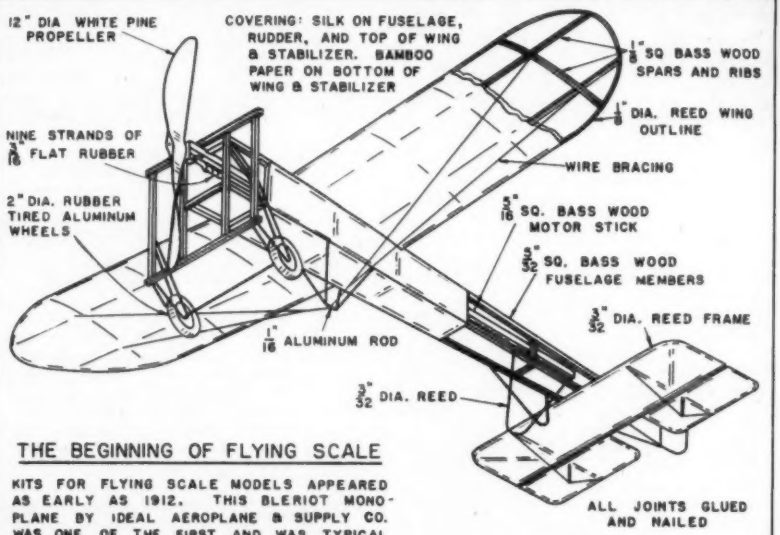
MODELS THAT MADE HISTORY

BY J. L. MACKENZIE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would win the Wakefield event at the World Championships unless he met unforeseen bad luck. September 5 proved these prophets to be correct; in rubber, Samaan is without parallel on the German scene: he may well be the world's best at the present. Oddly enough Samaan did not compete in rubber last year except at the World Championships; in the previous two national contests, he recorded only maximums each time he flew (he missed two rounds in 1953).

It is not surprising, therefore, that most good German Wakefields reflect the Samaan influence. There seem to be no gear jobs in evidence. Simple V-dihedral is seen as often as polyhedral; end plates on stabs have become a common feature, though some stabs have anhedral. Airfoils are either Samaan developments or the thin Benedek (Hungary) sections, with the result that glides compare favorably with the smaller A.1 gliders. Noticeable washout in wingtips is a universal feature, as is multi-spar construction of wings and stabs. Some of the ships had moderate pylons; others had none. Folding props have become as standard as in the States, with Bilgri being followed closely in prop diameter and pitch.

The team standing of Germany in FAI power championships when they have participated (1952—second, 1953—fourth, 1955—fourth) may not be striking until you realize that up to 1950, they were forbidden to build or fly gas models! Today, Webra in Berlin is one of the largest of Europe's motor-building firms, boasting world renown. A sprinkling of ED Racers and Taifuns could be seen at the German Nationals, but Webra's powerful Mach-I and the lighter .15 Winner monopolized the day. Though there are differing views in Germany, the most frequent approach pictures the gas model as a powered glider, making the most of good force arrangement and a powerful motor to boost climb. On the average, altitude obtained is less than in the States, but glide is slower and flatter. Unfortunately, as is true in the U.S. where the slab-sided kit models flown have advanced basic design little in the last five years, a number of German designs successfully flown in 1951-2 are still up to the task. This was true of Leppert's second place winner, built in 1951. Barth's excellent model used the same basic wing and stab as his 1953 Nationals winner, which he also flew at the 1952 international power contest in Switzerland.

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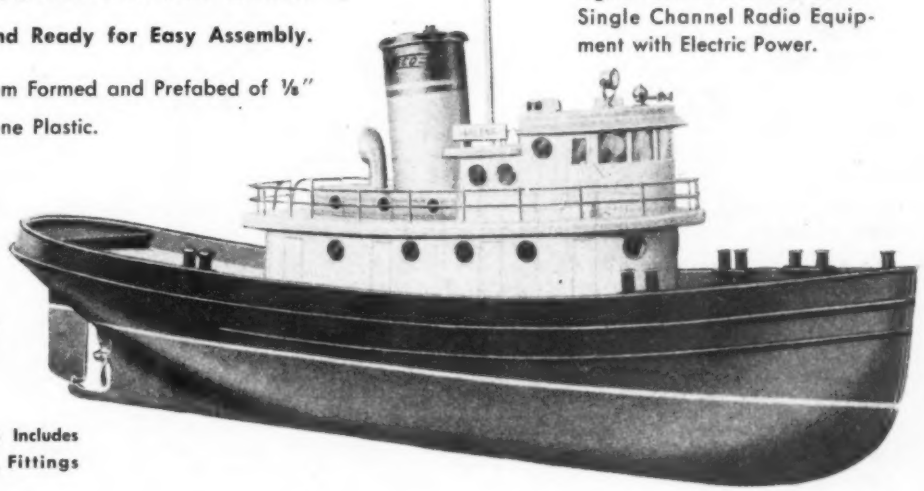

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formance is almost wholly in the motor. Certain design features were not surprising; almost all models had pylons and moderate or short moment arms to deal with Germany's windy conditions. There were wide variations in relative stab areas, but all were much less than the 40-50 per cent seen often in the States and England. Gliders are considerably better than in this country; undercamber is universally used and wing sections, although thin, are more cambered than those we use. Wing aspect ratios are higher, again improving glide, but by the same token a number of the ships wasted much of their power in circles during the climb. Wings are in two sections, mounted on the pylons by a number of ingenious means with plywood, dowels, music wire, or even clock springs. Construction is so complicated that most U.S. free flighters wouldn't attempt it. Balsa is coming to be used increasingly as the quality of Germany's imports improves. Rudders are most often integral with the fuselage and, in some instances, timer-operated tabs kicked in just before the motor stopped to throw the ship into its glide circle. Clockwork timers were used in the majority of cases and the fuse dethermalizer was king. VTO's were fashionable, with most models making a "transition" from take-off to climb pattern which wasted a second or two of engine run. The outstanding power model—that of Barth—when VTO'd, however, never hesitated, but went straight up at a good speed for the full engine run, then entered a Nordic-like, slow glide. Barth uses a Benedek section with eight per cent camber and an undercambered stab section. Several *Cumulus* copies evidenced the Germans' continuing high regard for Carl Goldberg's design: his G-610-b airfoil is a frequent selection. One young fellow appeared with a twin of Kneeland's Goldbergian "Vapour Trails." The weirdest gas job seen was that of Loeser, from Kiel, who combined twice the usual polyhedral angles and sweep-forward in his wing with an anhedral stab, bulky Zombie-type fuselage and long landing gear. Designed as an attempt to induce maximum climbing safety with a Mach-I, its glide was poor and the resulting performance disappointing.

Several clubs flew club designs and in each instance (Nuremberg, Wangen-Allgau) the workmanship and performance were on a high level. Mrs. Rudolph, who placed highest of the members of Germany's power team at the World Championships, flew the Wangen Club design, largely the creation of her husband. (Shades of Stan and Sandra Hill!) Winner of the power event, small class, was the only high-thrust design seen. The FAI power victory went to Piesk, with his very consistent stubby Webra Winner-powered pylon job. This ship seemed all wing and rudder, with a timer-operated tab handling the recovery from power to glide. Notable were the lightening holes in the pylon and diagonal fuselage members to save weight, as well as the first functioning two-wheel retractable landing gear your reporter has seen in free flight. The winning time missed quintuple maximums by a shade over a minute.

German aeromodeling is unique in the way it is possible to indicate leaders in certain events and areas of model aeronautics. For this reason, no report on Germany would be complete without listing some of these men. *Karl Heinz Stegmeier*, with a win and a second in the last two international radio control meets, is Europe's outstanding radio man. *Gustav Samaan* is the first man to achieve the true five-minute-plus-Wakefield model (in still air under the 80 gram rubber rule).

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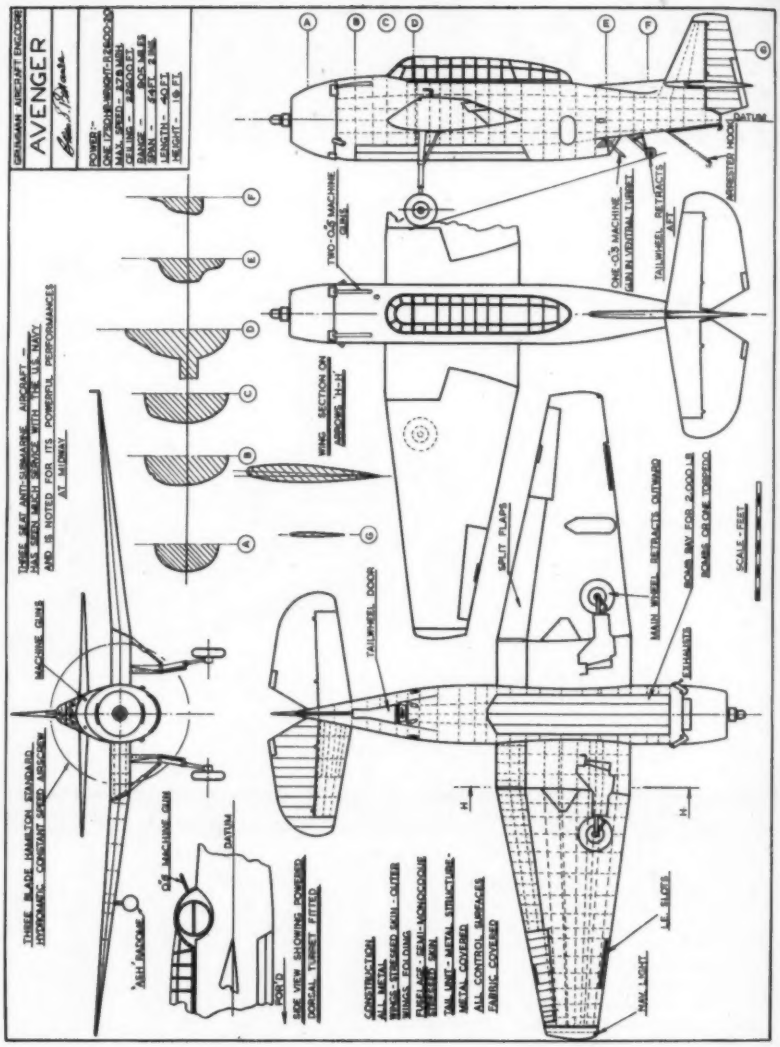
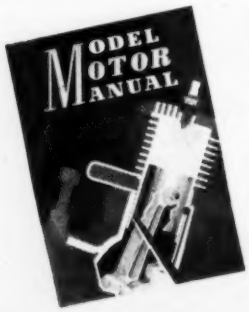


His margin of performance over *Josef Altmann* is indicated by the fact that Altmann flew 4⅛ minutes in both the national and international Wakefield fly-offs —enough to make him a threat any day in world competition. *Max Hacklinger* is without doubt Europe's best known towline man, by virtue of his extensive airfoil and design research. It is significant that he is from the same small Bavarian town as *Rudolf Lindner*, two-time Nordic world champion. Lindner's design follows Hacklinger's closely, using his airfoils and construction methods. To the mass of model builders in Germany, *Hans Finus* and *Hermann Naegele* are the best known designers, with a number of kits and plans (power and glider) on the market. Only now coming into his deserved prominence is *Dr. Richard Eppler* of Stuttgart's Technical College, who is viewed by his colleagues as the coming "Lippisch" in airfoil and stability research. (Lippisch is now a U.S. citizen, doing research in this country.) Eppler is following up the work of Schmitz on airfoils and airflow and cooperates closely with leading model builders (e.g., Barth, Altmann, Naegele) who put his theoretical advances to the practical test. Finally, one cannot fail to be impressed by *Alfred Gymnich*, former flight captain with the pre-war German Lufthansa Airline, who edits Germany's one genuine model airplane magazine, "Der Flugmodellbau" ("Aeromodelling"). Without accepting a salary himself, Gymnich assures the continuing existence of a magazine which presents detailed reports of German contests and provides opportunity for outstanding builders to publish outline plans and descriptions of their winning models. With men of this caliber leading the way, is it surprising that Germany is winning world championships?



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Radio Control News

(*Continued from page 26*)

resistor. These are some rather clever ideas which we feel someone may want to use.

As we have mentioned in the past, we'd like to see something new in actuators. Since blessings never come singly, we have a sudden influx in this line. To begin with, there is the European pneumatic system as developed by Karl Heinz Stegmaier of Germany. The pneumatic—or, rather, vacuum—system was first brought to our attention by Geoffrey Pike of Nottingham, England. The latest information comes from E. Kreulein, Binnenweg 135, Rotterdam, Holland and from Rico Neidhart of Geneva, Switzerland. Since this is a radically new type of actuator in this country, several issues will be devoted to it. It may sound complicated and bulky but it has many good features and, above all, it has been proven throughout Europe and in parts of England. Let's see how this system works and what its advantages and disadvantages are.

The sketch shows the basic system layout from the crankcase of the engine to the hook-up for the control surface. Mr. Kreulein outlines the advantages of the system this way: pulling power is in excess of 2 lb.; no batteries are required as for electro-mechanical actuators; control is very responsive and is self-neutralizing; lightweight construction and only two sets of batteries are needed for receiver installation: a 45V and a 4½ or 6V. The 45 is for B supply and the 4½ to 6 for series filament and for secondary relay work. Incidentally, this system is most practical with reed equipment.

Among the disadvantages, some difficulty may be experienced in making the valves; an auxiliary air pump must provide power when the engine cuts off; valves should be built into a small metal box with a filtered air intake.

The secondary relays act as electro-mechanical valves for the admission of air to the diaphragm, dispensing with need for electrical point contacts on these units. The power of the unit is proportional to the face area of the diaphragm. Photo A shows the receiver and reed unit used by Stegmaier. Note the position of the reed contact and the scale of the unit as compared with the tube. The receiver is mounted within an aluminum can. Shown are the reed unit and the eight air lines plus the relay valves at the top of the unit. Photo B shows in detail the relays and the air valves. Needless to say, the construction must be rigid and all moving parts well fitted and free moving. The drawing on this system comes from Mr. Kreulein. Next month we'll have more details and pictures on this fascinating actuator system, plus information on other actuators.

NEW ITEMS

Along with the tulips and daffodils this Spring, we have a new crop of escapements. The first one, while not really new on the market, is quite worthy of comment. This is the Citizen-Ship model SE. Made and distributed by the Citizen-Ship Radio Corp., P.O. Box 5971, Indianapolis 20, Ind. and selling for $7.95, this unit measures about ⅛ x 1⅛ x 1¼ in. and weighs less than 1 oz. Extremely well built, this escapement operates from a 3V source, has low current drain and features selective operation. One pulse gives right rudder and two pulses will give left rudder. We checked our unit and found it to be fast in operation and with no tendency to skip.

The other escapement comes from Lafayette Radio, 100 Sixth Ave., New York

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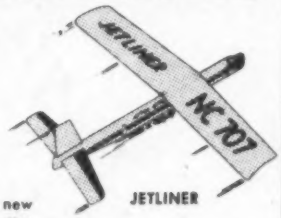

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City and is rather unusual with its low price of $2.45. Measuring ⅜ x ⅜ x 1⅜ in. and weighing less than ⅜ oz., this unit has a low current drain when used on 3V. Very well made, despite the low price, this should be a popular escapement for auxiliary work or where space and weight are at a premium in that new job. This is a fully assembled and tested unit, not a kit.

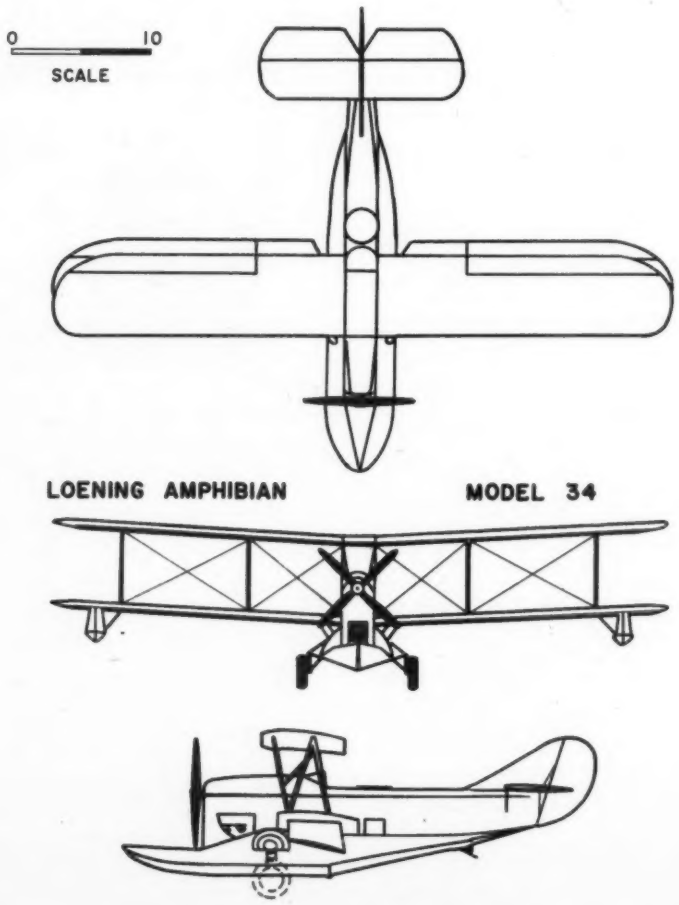
Are you a relay hound? Then you may be interested in the new, low-cost sensitive relay by Sterling Engineering, c/o Potter & Brumfield Manufacturing Co., Princeton, Ind. Although this new relay measures a slight 1 x 1 x 1⅛ with a 1¼ oz. weight, it takes a fair amount of shock and vibration and is available in coil resistances up to 22,000 ohms. Prices were not available when this column went to press but your local electronic distributor who handles Potter & Brumfield relays can supply you with the price and additional information.

From Lafayette Radio, too, comes a variety of miniature high-capacity electrolytic capacitors needed for certain transistor and audio tone circuits. A selection of sub-miniature switches and volume controls, in addition to the ultra-small GEM relays, is also available. Tired of winding tank coils? Then check their supply of B & W Miniductors. These are ready-wound coils, reinforced with polystyrene strips, available in 16 different windings. You can get sub-miniature phone plugs and jacks for only 69c per set.

Also from Lafayette, a new two-pronged connector, available separately or mounted two on a strip. These would make fine shorting plugs and jacks. The cap of the plug may be unscrewed prior to the attachment of the wires and the sets are priced at 22c for the single unit and 35c for the double job. Diameter of the plug is a small 7/16 in. Are you doubtful about that transistor? Then check it with the transistor checker which you may build from Lafayette's $7.95 kit. Checks PNP or NPN jobs for shorts, leakage and gain. A good club item.

One of the best ready-to-run units we've seen comes from Polk's Model Craft Hobbies, 314 Fifth Ave., New York City. This is the Cheryl Ann tugboat, completely painted and with full radio gear. A transmitter is also included, as are all the needed batteries. Just set 'er in the water and you're ready to go. For those who want to get into RC work with the least amount of trouble, this complete outfit is yours for $89.50. One other excellent item from Polk's is the Shok-Foam. This is a material which does not have the resiliency of foam rubber (too much resiliency can be as bad as none at all) but which will absorb a considerable amount of shock. Available in thicknesses of ⅜, ½, ⅝ and 1 in., this material is easily cut with scissors and bonded with regular model cement. This is a new development in the field of resilient plastic foam material and it should lend itself to RC packaging quite well.

This item on Bramco reed equipment



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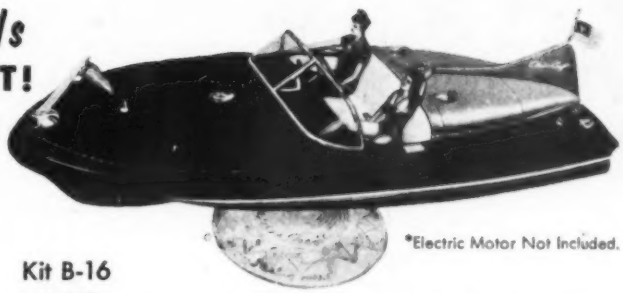

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For engines from .09 to .19 displacement

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Sterling MODELS

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might well make a Tech Topics discussion too. The company informs that their transmitter audio circuit can tolerate a 30V drop on the B supply with only a one-cycle change in frequency. This fact, coupled with a five-to-ten-cycle spread of the reeds, provides excellent reliability. The type of circuit featured in this transmitter cancels need to "age" the batteries, a process described previously in this column. Here, again, it should be pointed out that all equipment should be operated according to the manufacturer's specifications. The carrier and tone are keyed simultaneously in this transmitter, thus prolonging battery life. We've seen this equipment put through its paces in a large, high-speed biplane and can vouch for its reliability.

CLUB NEWS

From Ralph Brunson of 2739 72nd Ave., S.E., Mercer Island, Wash. comes news from the Apple State. Considerable work is being done toward transistorizing RC receivers. These receivers are of the tone type and use a hard tube only for the detector. A novel feature is the use of a transistor in a separate quench oscillator. This arrangement makes for extreme sensitivity and stability. Proportional systems seem to be the hot item at present, in addition to a B battery eliminator for receiver use. The input to this B battery eliminator is 4½V at 50 ma (sub-min pencells) and the output is 45V with no load, or 41V with a 4 ma drain. Weight of the unit is only 6/10 oz. This sounds like a good idea and we'll try to get more info on it for you in a future issue.

Geoffrey Pike of Nottingham, England sends in his views via tape recording and here are a few of the highlights. In the past we have run several ideas regarding the reduction of vibration. Basically, these ideas dealt with isolating the main source of vibration, the engine, by means of various shock mounts. It is Geoff's opinion that the engine as well as all radio gear should be solidly mounted, with the mass of each mounting block as concentrated as possible. The relays should be mounted on the receiver. Since we try to give you some food for thought, you now have two main courses on the vibration problem. Which do you prefer? Geoff also uses 5 ft. nylon-covered floats on his 10 ft. RC job. Each float weighs 12 oz. His big problem is to find a suitable elevator control, one with no sequencing action and preferably spring-loaded to neutral.

How about that FCC registration blank? Lafayette Radio now gives an FCC registration blank with each inquiry on RC transmitteers. Essco, Polk's, Citizen-Ship, Babcock, Aerotrol and the majority of the equipment manufacturers supply the needed blanks; therefore, there should be no excuse for not submitting your registration form when you buy equipment. If you have built your own transmitter, it is your duty to obtain FCC Form 505, fill it out and send it to the Secretary, Federal Communications Commission, Washington 25, D.C. The Commission's files reflect an increased number of registrations but we still have a long way to go. One hobby shop owner has stated that he feels the dealer is often responsible for the lag in registrations. Each and every dealer who sells a ready-built transmitter, kit or crystal should see that the customer receives the FCC registration blank. If he doesn't, the hobby dealer may soon be out of the RC business.

From Robert Drews, 231 S.W. 150th, Seattle 66, Wash., comes a picture of his RC model. Vital statistics: wing area, 600 sq. in.; weight 4¾ lb.; Citizen-Ship 465 receiver; Babcock Compound escapement

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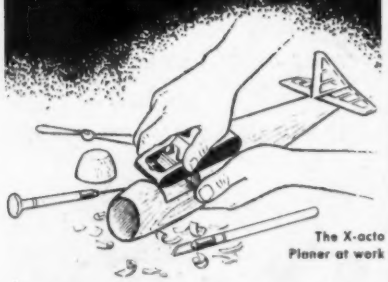

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and a K & B .15 swinging a 9-4 prop. A rugged flier in high winds, this model has racked up about 300 accident-free flights of five minutes' duration each. So far, it has taken two first places and one third in contest work. Other points of interest from Bob include the occasional cleaning of the relay points with carbon-tet and the minimum use of friction or mechanical connectors in making the receiver-escapement-battery hook-up. The connections to the B battery and to the AR 465 mc receiver are soldered in place. The A batteries and the power for the escapement are contained in Hillcrest battery boxes. Bob states that greater reliability can be achieved if the connection to a point is made mechanically before soldering and that enough slack or strain relief be used to prevent fatigue of the wire at the soldered spot.

And last but not least we have one of those things that "just don't happen to me." This concerns the use of metallic dope on the fuselage when using 465 mc equipment. In fact, trouble was encountered when using a Luscombe Gray dope. This dope was found to contain a metallic substance which in effect shielded the signal when the plane was airborne. Ground checks gave no indication of this phenomenon. When the ship was recovered and regular non-metallic pigmented dope used, the problem was solved. The reason for this could be a combination of reflected and absorbed energy from the transmitter. UHF is often tricky and unexplained with regard to its behavior. Again, play safe and follow the manufacturer's instructions and don't use a metallic dope if you plan to use 465 mc equipment. On 27 or 52 mc, the antenna is brought to the outside of the plane, in order to pick up the radiated energy.

The Seattle Radio Aero Club (Jim Lackey, 11910 S.W. 18th, Seattle 66, Wash.) is making plans for Spring and Summer flying and all interested parties in that area are invited to join. Their new insignia features a small plane flying across a cloud, with the initials SRAC in snappy script.

RC modelers living in upstate, Eastern New York and Western Massachusetts are requested to contact R. L. Elliott, 48 Curtis Terrace, Pittsfield, Mass. or Richard Ryan, 22 Moffett St., Mechanicsville, N.Y. regarding the formation of an RC club. Multi-control work with Schmidt reed equipment in modified Cubs is most popular. In fact, several 6 ft. Cubs, a la 7½ ft. Schneider, are being built and will be known as the East Coast Cubs. More on this group, which is looking for a club, next month.

Contest Calendar

MARCH

11 *Long Beach, Calif.:* Class AA Esquires' Team Race. D. C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

11 *Bakersfield, Calif.:* Bakersfield Record Trials for FFG. Francis Stewart, C.D., 900 21st St., Bakersfield, Calif.

18 *Haddonfield, N. J.:* Class AA 4th Annual Polar Bear Meet for CL, beauty, TR, CLS, CLC. Reno Farinelli, C.D., 215 E. Orchard St., Hammonton, N. J.

APRIL

8 *Bakersfield, Calif.:* Class AA Bakersfield Annual Meet for FFG. Francis Stewart, C.D., 900 21st St., Bakersfield, Calif.

JULY

23-29 *Dallas, Tex.: Class* AAAA National Championship Model Airplane Contest.

Something to do!

(*Continued from page* 13)

Stress slow, careful work: most boys will be too anxious to see results quickly to do good work at first. But let all the work be the personal achievement of the students: the instructor should not insert any experienced touch.

Use only the kit, cement, razor blades, pins and dope—nothing else. This reduces initial investment and sparks each boy's own initiative and craftsmanship as no power tools ever could. The "minimum" approach should be psychological, too. Break down the job for the boy: ask him to build, for example, first the body, then the wing, then the tail. Do not expect the boy to focus his efforts on a finished plane he will not see for weeks.

Remember any boy working on his plane is immune to horse-play. The best way to empty that class is to let playing around break a few planes. Genial and sincere conversation can make a good break in routine: watch for those boys whose temperament indicates need for more frequent breaks. Remember, too, that the beginning attention span of an 11-year-old is rarely over one-half hour. And a good "advertising" gimmick will not be out of place to concentrate attention on the plane to be built by keeping a display model prominently mounted.

Now for the mechanics of the program itself. The first plane will "fall together" for most boys and is used only to acquaint them with instructor's methods and the parts of the plane. But the first *real* model is the little T-Craft, which allows a creditable performance while remaining simple enough for the majority. The only unconventional handling of this kit was to build the fuselage in halves and to finish completely the first half while it was on the plan because here direct comparison will show up mistakes.

Covering requirements, a crucial point for beginners, are well satisfied by dry paper bonded to the structure by cement.

Start the boy off with the bottom of one wing panel, perhaps saying, approximately, "You want the paper to be tight in this direction (hold it there) and this direction (hold it in that direction) and this way. Let me see you do it." After it becomes obvious that two hands can't hold the paper tightly in more than one direction at one time, you start again. "Let's pull the paper in one direction and *hold* it there with cement. When that dries, you have your hands free to hold the paper in another direction." The two basic principles that must be put across are: using cement as "extra fingers" and using the largest piece of paper possible as long as the area to be covered is flat. It will usually be necessary to explain to an 11-year-old the meaning of "plane" or flat surface.

Brush on water to shrink the finished covering and two coats of clear dope to finish the treatment, followed by the final coat of colored dope. And remember that boys love all sorts of astounding colors: reds, chocolates, passionate pinks.

But the second plane—the 50c Sparky—is the big hurdle for the student, starting with one of the side frames, built first, for the student will not make the splices and joints carefully enough. He should be taught immediately to take pride in each joint as a perfect achievement in itself and to recognize the countless future troubles that will arise from poor connections. Then the second side is made by covering the first with waxed paper and building directly over it to insure exact likeness.

The two sides are joined in the middle by four sticks—two top and two bottom ones. Keep alinement in mind here so that the ends meet when brought together

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(after those cross-sticks dry, please) where they are cemented. Next, rubber bands bring the front ends to the proper spacing and the nose former is cemented in place. Of top importance in this stage is having the boy cut out top and bottom stick at the same time to insure uniformity.

The only other possible difficulties involve wing dihedral joint, covering of the upper back body (use a few cheap sticks to flatten complex curves into plane surfaces), and the sanding of the TE's of the wing. For this, use a 6 in. square to prevent humps and lumps but your real difficulty will be in getting your student to remove *enough* wood: the youngster usually gets tired of sanding long before the wing has been properly shaped.

Only clear dope was used on Sparky, as on the towline gliders later, but an original touch can be applied to each model by cutting the builder's name from contrasting colored tissue and doping the letters to the wing.

The grand project of the course—the $1 T-Craft—requires no special instruction, actually being fairly easy to build. It may be used as a FF gassie trainer with any Half-A engine.

And now the prospective model shop instructor can take it from here, with plenty of room for his own innovations.

Jumbo . . .

(*Continued from page* 15)

Several additional models were built to experiment with various wing areas, control surface areas, wing sections and tail moment arms. I found that the stability of the design seems to depend very little on the CG, with the airplane becoming more maneuverable and sensitive the farther the CG moves to the rear. I would recommend, however, that the builder experiment with nose and tail ballast until he finds the CG location he likes best for good all-around performance.

The culmination of all the experimentation is represented in the Jumbo version shown here. The original model is entirely covered with colored silk with bright yellow wing and tail center sections and bright red tips. The fuselage is covered with two layers of silk and is doped red. A clear finish coats the wings and tail for weight reduction but appearance would be improved and performance should not suffer much if a full color finish were applied to the entire model. The model may be powered by any .49 to .65 engine. A hot .35 would probably give sufficient power if weight is kept low with a lightweight finish.

If a racing .60 is used it will probably be necessary to use a restrictor in the intake to boost fuel suction. A regular needle valve assembly must also be used in place of the racing type. A pair of Walker pressure tanks are the best bet for a racing engine like the McCoy .60, as even running is assured and no restrictor is needed. If a regular wedge tank is used, it must be mounted with its center line exactly level with the spraybar, otherwise tight maneuvers will be accompanied by very poor running.

Start construction with the fuselage. This is carved in two shells, top and bottom, from two medium soft pieces of balsa measuring 1⅛ x 3 x 36 in. On each piece, first trace the outline of the top view of fuselage. After sawing these out, trace the side outline of the upper and lower shell on each shell and saw to shape. Next, round off each shell and hollow out. A large, half-round X-Acto gouge is satisfactory for this. Leave about ⅛ in. wall thickness. Use oak, maple or birch

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for the motor mounts. Cut out the lower shell to fit the mounts and shave sides of mounts until the outside edges of mounts and lower shell are clean and flush. Apply two or three coats of cement to the mating surfaces of mounts and lower shell, allowing sufficient time for each coat to dry. Then cement mounts in place. Mount engine in place with about 3° offset for right thrust. Mount a 2 in. Froom needle-nose spinner on engine and trim the lower shell to fit spinner. Cement two strips of strong linen or Flightex 1 in. wide along joint of the lower shell and motor mounts. Mount the firewall in the lower shell.

The wing construction is quite conventional. The tips are carved from soft balsa and the inboard tip is hollowed out. Place a 3 oz. weight in the outboard wing tip. The bellcrank floor is mounted in slots in the two thick root ribs. Install the bellcrank and lead-ins, and make wing flaps and tail assembly. The flaps and tail assembly should be covered with silk for greater strength. Cut a piece of soft ⅜ in. plywood to make the bulkhead that fits the lower pan for the landing gear mount as shown on plans. Drill two ⅜ in. diameter holes 1⅛ in. apart through the bulkhead. Cement bulkhead in place after first double-cementing; then install landing gear. Cut the lower shell to fit wing and install wing double-cementing. Apply a good cement fillet around landing gear bulkhead where it meets the root ribs. A piece of linen is cemented over the landing gear on bottom of fuselage. By omitting the linen retainer, you may utilize a drop-away gear.

For the wing flaps you may modify a Veco horn this way: bend the prongs to reach just outside the fuselage on each side and slip a 2⅜ in. length of brass tubing over each prong and solder. This is done to prevent the prongs of the horn from working loose in the flaps. Mount the flaps and install pushrods. Wrap a little copper wire around the end of each pushrod and solder to retain pushrods in place. The tank may now be installed. Cut off front cowl section from upper pan and cut upper shell and cowl to fit engine cylinder. Assemble fuselage wrapping with a 2 ft. length of rubber to make a good joint between upper and lower shells. Key cowl with dowel pins and cement music wire hooks in insides of cowl and lower pan. The cowl is held on by elastic bands attached between these hooks. Cover wing and dope model according to taste.

In flight, try various line lengths to decide your own most suitable ones. For .49 to .65 power use 70 to 100 ft. of .016 wire. Always pull test lines before flying, particularly if you're using a peppy .59 or .60. And now you have a thrilling experience before you.

The MAN .19

(*Continued from page* 22)

and using the borderline size offers a good excuse for making an alternate glow head and investigating the performance merits of each version. Carrying curiosity a stage farther, we have provided for two different carburetion set-ups: disc valve and reed valve, so that again the merits of each can be established for Diesel and glow in this particular size.

Above all, the design is based on proven concepts, dimensions and materials, is simple and straightforward to construct, is unusually compact and rugged and, in all its forms, is a very hot performer. Weight runs around 5 oz. and power of the simplest version is about .35 bhp at 13,000 rpm. The hottest variety will hit close to the magic ½ hp.

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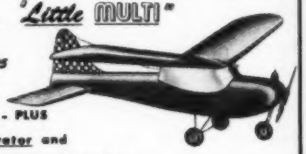

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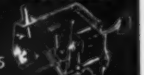

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project will have a lot of laborious lathe work and filing ahead of them, both of which are conducive to dark and bitter thoughts and doubts, it is perhaps advisable to give some reassurances.

The ball bearing Amco 3.5 Diesel, designed by the author in 1950, was a development of the plain bearing 3.5 designed in 1948. Many thousands were, and still are, manufactured and, dare we say it, are notable for very high output, light weight and extreme compactness. The ball bearing type also has outstanding flexibility and startability and, when properly made, extreme durability. The MAN .19 in its ultimate form, which you will help decide, is, in a sense, the Series III version, embodying all the improvements that have become evident since 1950 and all the satisfactory features proved by modelers since appearance of the prototype in 1948. In short, you are not going to sweat over a shot in the dark: if you build it to the drawings and description, you are sure of satisfactory results.

The accompanying illustrations have given you an idea of the layout and a few words of explanation will help to persuade you to have a crack at it.

The vital dimensions are large enough for a normal .29 but, if we are miserly with waste space and similar considerations, the weight is still satisfactory for a .19, and over-all size is close to the minimum possible. In this case, this means high efficiency and extreme rigidity. Large ball bearings are used of a size easily obtained and the front bearing is large even by .29 standards for reasons to be explained. A ¾ in. threaded shaft is used for obvious reasons. No threads are used on the cylinder liner and no end-to-end clamping pressure employed. This simplifies construction and minimizes distortion. A standard needle valve unit is employed because it is a waste of time making one when such a variety of types is available and an unusual carburetor design will be offered as an alternative after the engine construction has been covered. The backplate is attached by screws for disc valve indexing purposes, although the radial location of the alternate reed valve is unimportant.

The exhaust stack is an important part of the crankcase unit, as the head screws into it to sandwich the liner port flange, in similar manner to the Anderson Royal Baby Spitfire.

Prop driver location is by keyways in the McCoy Red Head manner, but for those who cannot get the use of a milling machine, an alternate flatted shaft drive is described.

Mounting is beam type only, although the backplate screws could be used for radial mounting. However, to our mind, the beam method is preferable in every way, except for the extra work involved.

The illustrations show the disc valve backplate and carburetor location. On the reed unit, the intake location is optional, as will be described.

Any other points we may have missed will become clear as the work proceeds; meanwhile, you will want to know what materials and tooling are required. A normally-equipped, screw-cutting lathe having centers 3 in. above the bed is essential. We use a 9 in. Southbend. Desirable is a right angle attachment for the face plate, although a satisfactory substitute can be made from 2 in. angle iron filed true. A bench vise, a hacksaw and a good selection of files are necessary as well as a wire brush for cleaning the files. A drill press will help as well as some means of grinding the piston and contrapiston. Both will save time and effort but may be omitted; we used neither.

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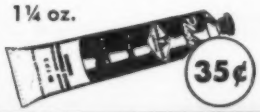

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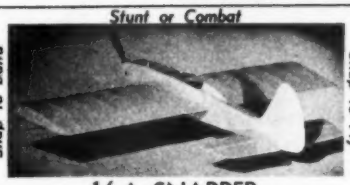

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These are the materials required: one piece of each of the following measurements of duralumin (all measurements in inches): 2½ dia. x 2½ long *or* 2¼ x 2 x 1⅝; 1⅝ dia. x 2; 1¼ dia x 1⅝; 1 dia. x 1; ⅞ dia. x 3. Also, one piece of cold rolled steel, 1 dia. x 4; one piece of close grained cast iron or Meehanite, ¾ dia. x 2; one piece drill rod, 3/16 dia. x 3; two ball bearings, any make: one S3, ¾ ID x ⅞ OD x 7/32 and the other, S1, ¼ ID x ⅜ OD x 7/32. Please note that bearings come in three standard fits; select the medium—00—type. An allowance for scrap is included in this listing, exclusive of the crankcase.

You will probably be somewhat astonished at the commonplace materials used. The cold rolled, for instance, is for liner and crankshaft and, contrary to popular belief, a very large percentage of commercial engines employ a similar grade of material very successfully. You can, if you prefer, use a higher quality case-hardening mild steel, but it is not important.

The toughest part of the job is the crankcase and for that reason alone we will take it first. Before marking out, we need two adjacent faces dead flat and at right angles; therefore, set the workpiece in either a three-jaw or four-jaw chuck, depending on whether you have a piece of round bar or a block, and clean up one face. Next, use this face as a seating on a right-angled plate bolted to the face plate and clean up the adjacent face which will eventually be either the back, or the top, of the crankcase. This accomplished, you can start marking out. First step is a center line on both faces. If you are using a piece of 2½ in. round, the dressed end will be the *back* and the 1¾ in. wide flat you have machined will be the *top*. If a block, the 1¾ x 2¼ in. face will be *back* and the 1¾ x 2 in. will be *top*. Mark the faces accordingly with the scriber. On the back, exactly 1-11/32 in. from the top, scribe a line intersecting the center line at right angles. Lightly center punch the intersection. Next, scribe a line on either side of and parallel to the center line on the back, 17/32 in. away from the center line and extending only from the cross line downward. The diagram will make this clear and illustrate the portions to cut away, but before doing so, mark a line on either side of the 1-11/32 in. piece from the top and check its truth from the back with a setsquare.

Great care should be taken with the marking to insure accuracy. Its purpose is to establish the underfaces of the beam mounts exactly 1-11/32 in. from, and parallel to, the top face of the workpiece, as the mounts will be used as a datum and location for all subsequent machining of the crankcase. The diagrams illustrate the other successive stages of marking and cutting in order to achieve the rough crankcase shape, which, while an unpleasant and laborious business, will remove most of the donkey work included in the job and clears the way for the more skilled and interesting work to be described next month.

CONRAD CONROD
GOOD! WHY I AM ZE FINEST PUPPET MASTER IN ALL EUROPE.!!
YOU SAY YOU'RE GOOD EH?
O.K. MASTER - IF YOU'RE THAT GOOD, WE'LL BOTH CLEAN UP - NOW THIS LINE IS FOR THE LANDING GEAR, THIS ONE IS FOR THE FLAPS, THIS IS THE THROTTLE, THIS ONE IS FOR THE BOMB BAY, AND THESE TWO HERE . . . . .
JUDGING STANDS
BK-41

Foreign Notes

(*Continued from page 35*)

Aktivist motor which, a year or two back, was introduced to replace the obsolete Zeiss .12 cu. in. Pionier, has been developed through no less than five models to date. These engines are built at the world famous Carl Zeiss optical instrument works at Jena. Thus far, however, Zeiss motors have not achieved the world-wide acclaim accorded to other Zeiss products. Basically, the Aktivist is a .15 cu. in. radial port Diesel with rear crankcase induction and the first model used a disc rotary valve, plain main bearing and had a large diameter finned cylinder barrel held down by screws into three crankcase lugs. The Aktivist II is virtually the same but has a twin ball bearing shaft. In the Aktivist III the rotary-valve assembly is replaced by a new backplate unit incorporating a reed valve. These three engines are stated to be for free flight work. The Aktivist IV and Aktivist V are similar, respectively, to the II and III models, but have small diameter screw-on cylinder barrels and revised crankcase design and are intended for controlline use.

Cuba

Another report from Habana seems to confirm an earlier suspicion that thermals there start at zero feet. Testing Nordic A.2's on 30 ft. of towline (no dethermalizer) at Columbia AFB, two modelers, Tony Alvarado and Roman del Castillo, lost models OOS. If it ever happens that the Wakefield is held under such conditions, we wonder what sort of answer the rule makers will think up.

Japan

Japanese modelers continue to produce outstanding controlline scale models. Our photo shows a fine Lockheed Constellation transport powered by four OS Max-1 glow plug motors: two .29's and two .35's. Just now, prop-driven scale jobs seem to be well to the fore again, following a spat of pulse-jet craft during the past three years.

Austria

Noted European modeler on a year's visit to the U.S. is Austrian free flight man Oskar Czepa, world glider championship winner in 1951. Ossi will be working with Gerald Ritz in Chicago and, he hopes, keeping up with the model building at the same time.

In Brief . . .

Expect a new glow .35 from an old established European manufacturer. Hitherto, .35 size has been neglected in Europe. Will probably be imported into U.S. . . . First indications are that reception of FAI rule changes is mixed but it is still early to get world-wide reaction. We await further reports . . . In November, 1955, MAN at Work reported suggestion that many .35's exceed .350 cu. in. Correct. According to our figures, Fox .35 and Aussie Sabre .35 are .3519; Torp .35 is .3529; Japanese Max-1 is .3555.

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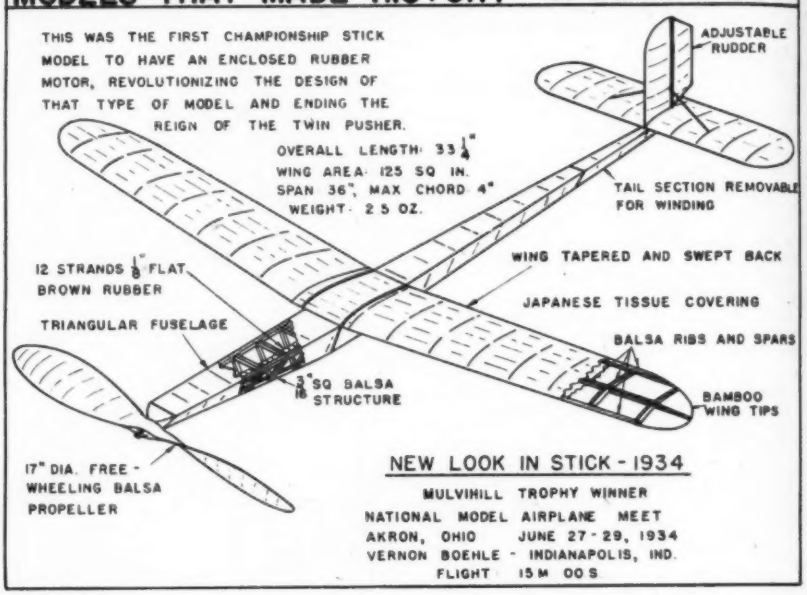
MODELS THAT MADE HISTORY

BY J. L. MACKENZIE


THIS WAS THE FIRST CHAMPIONSHIP STICK MODEL TO HAVE AN ENCLOSED RUBBER MOTOR, REVOLUTIONIZING THE DESIGN OF THAT TYPE OF MODEL AND ENDING THE REIGN OF THE TWIN PUSHER.
OVERALL LENGTH 33 1/4"
WING AREA 125 SQ IN.
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ADJUSTABLE RUDDER
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WING TAPERED AND SWEPT BACK
JAPANESE TISSUE COVERING
BALSA RIBS AND SPARS
BAMBOO WING TIPS
12 STRANDS 1/8" FLAT BROWN RUBBER
TRIANGULAR FUSELAGE
3/16" SQ BALSA STRUCTURE
17" DIA. FREE-WHEELING BALSA PROPELLER

NEW LOOK IN STICK-1934

MULVIHILL TROPHY WINNER
NATIONAL MODEL AIRPLANE MEET
AKRON, OHIO JUNE 27-29, 1934
VERNON BOEHLE - INDIANAPOLIS, IND.
FLIGHT 15M 00S

MAN at Work

(*Continued from page 6*)

iness, with movies, yak sessions (George Moir, Model Motors Service, P. O. Box 515, Mantua, N.J.) . . . Philadelphia Sky Pirates (Dick Opperman, 3073 Joyce St.) is hot as a pistol. Proves kids off the streets make good modelers . . . Swiss firm looking for movie films on building and flying models, particularly those made by clubs. Will be shown to Swiss Boy Scout and hobby club meetings. Would pay for the loan or for copy of films. Address: Quincaillerie Max Schmidt Jr., St. Laurent-Haldimand, Lausanne, Switzerland. Venezuelan distributor has the same problem: Hobbies y Deportes S. A. Apartado 4214, Caracas, Venezuela.

Reminds us, too, that the ever-watchful Tony Alvarado, Havana, says we should spell "senoras" not "senores" if we make gay with more captions . . . Words of wisdom from George Steinhauser, Gibsonia, Pa.: "Teenagers should take up a hobby to avoid becoming juvenile delinquents. Adults should take up a hobby to avoid heart attacks. Hobbies are good for everyone."

• • •

► Flying scale, stunt, combat and free flight, the Niagara Falls Aeronauts, 921 Armoury St., Niagara Falls, Ont., Canada round out four years of active modeling.

From Lubbock, Tex., news that the Texas Eagles are preening their wings again. Looking for new members, especially beginners (Warren Warner, Box 334, Gordon Hall, Texas Tech College, Lubbock, Tex.).

Meet people in all kinds of places, under all kinds of conditions. Example: During the Philadelphia Nats, Jim Walker was showing us late one night how the Ceiling Walker could be modified to fly up and down between floor and ceiling. Every time it hit the ceiling, it went into reverse, sank to the floor, then zoomed up again. Between a work bench and the floor, the model flew back and forth like the ball in a pro tennis match. So three years later Cleon Newman, Corning, N.Y. says it was his bench we used and off he goes: Cleon goes in for gull wing free flight—says Barney Snyder's Spooks have nothing on him. What's a Spook? That question reminds us of the young adult customers in Polk's yesterday who were stumped by an Atom and a Brown engine. Time marches on! Cleon says the "gulls" have never spun to the left but not to ask him about the right! Seems to us that's a big trouble with low wings, too. In general, it's touch and go to fly right under power. Designs all his ships a la Sir Charles Grant—and, speaking of Charlie, you old timers will be interested to hear that the war horse is threatening to take in contests again. Bone up on CLA!

"TONE-AEROTROL"
Radio Control
by Berkeley
Designed by: Dr. Walter Good
As easy to operate as a Home Portable!
Tone Control on 27.255mc.
No License Examination Required!
$29.95

"TONE-AEROTROL"
27.255 MC. TRANSMITTER
$49.95
A High-Low Power Output control switch gives range control. Pilot light positively indicates operation. Metal carrying case with handle measures 8" x 10" x 10", weighs 15½ pounds. Comes complete with Crystal and Whip Antenna. (Less Batteries)

"TONE-AEROTROL" RECEIVER
27.255 mc. 4¼ oz. 2⅝" x 2⅝" x 3"
Low battery drain. Three tubes operate for long periods without any adjustment. Receiver complete with a 5000 Ohm relay

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Combination "Super Aerotrol" TRANSMITTER-RECEIVER Kit (less tubes)	$29.95
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Assembled, Ready-to-Operate "Super Aerotrol" 27mc. TRANSMITTER & RECEIVER	49.95
"Super Aerotrol" ESCAPEMENT — Self Neutralizing — Assembled Only	3.95
Super Sensitive Adjustable Contact RELAY — 5000 Ohms — Weight — 2 oz.	7.50
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XFG-1 TUBE — For Installation in "Super Aerotrol" 27mc. Receiver	3.50
3A5 TUBE — For Installation in "Super Aerotrol" 27mc. Transmitter	2.25
72 Page Book on "RADIO CONTROL for Model Aircraft and Boats"	1.00

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Basically the PSST "50" is a Rocket Engine, not a Jet. It can operate even under water. Improved in design over existing engines, it uses the standard fuels sold at Hobby Shops.
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HI-V "50" FUEL
The high velocity Jet-Rocket fuel that is easier to start and burns clean. Try it and you will use it always.
Pack of Ten 50c
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Cleon is a model building dealer—and that's really being caught in the middle! Says plastics make neat models—remembers the messes that used to be turned out from the old solid kits, even with die-cast motors, props, etc. He's not so sure about the yo-yos, but ever since Godfrey demonstrated one on his program, Newman can hardly sell anything but. Every third customer (a mother) wants an airplane like the one Godfrey had. But what Newman really wanted to put across is that it's up to the dealer to see that every new RC'er fills out the station license Form 505. Every dealer should have spare forms and envelopes addressed to the nearest branch of the FCC. Every RC customer of Newman's operates a licensed transmitter. If he can do it, they all can do it.

• • •

► This problem of the FCC license is getting to be a painful business. Why manufacturers keep claiming that 27.255 is a license-free frequency baffles us. You do have to have a station license; you get it by filling out Form 505 and sending it to the FCC, Washington, D.C. (if you can't find a local address) and it is against the law to operate without it. The words "license-free" are dishonest. Exam-free is about as near as you can come and be accurate . . . Ken Willard, hearing that Chicago is about to—or has already—started up a 500W transmitter to operate traffic lights on "our" frequency, suggests that all RC'ers in the vicinity go to downtown Chicago on some specific date with their transmitters and bring traffic to a shuddering halt. Having transmitters that are licensed, they would simply be using them in a legal manner. FCC would have to come to grips with the problem, says Ken. Rawther drastic, we thinks, but it's getting to be a drastic situation. Next thing you know, drivers will change the lights themselves! At least one New York modeler is picking up some Chicago operator on 27.255. Brother!

Los Angeles Model Airport enters Phase II of its development. Phase I was a 75 x 200 ft. RC runway; Phase II will be four 40-ft. blacktop circles for free flight take-off areas and the first of four blacktop circles for U-control . . . Francisco Laboratories has free sport shirts waiting for National Champs and record holders of the past year. Title holders write directly to 3015 Glendale Blvd., Los Angeles, Calif. . . . Ninth Annual National Model Plane Show, Higbee Auditorium, Cleveland, Ohio, March 24 and 26. Sponsored by Air Foundation and the Cleveland Chamber of Commerce, attracts 2,000 models and 30,000 spectators. Address Air Foundation, 400 Union Commerce Bldg., Cleveland 14, Ohio . . . John Kelley Abbott, Skyraider, last issue, says the ship may be capable of speeds as low as 15 to 10 mph. Usually, high CG ships in Carrier want to fall off on a tip. Slow 'em up and free flight stability becomes factor . . . Niagara Frontiers Model Aircraft Assn., Warren Guess, 265 Buckeye Rd., Buffalo 21, N.Y., newly formed club looking for members . . . John Smith, Marietta, Ga., says rivets on solid or planked model can be made with an HO railroad tool called Rivet Wheel . . . Second King Orange International Model Airplane Meet, last December 30-31 and January 1-2, got lots of nice notices. Bob Quick, Bill Lumley and Ray Matthews did well at directing. Hear that Dale Kirn swept the speed events. Eeyow! Bill Dunwoody won the Nordic with the model he had last issue of MAN. Another reason to build it. Rejected many a Nordic and this is a good one . . . See by the Midwest Modeler, Galesburg, Ill., that the local club will put on a pancake breakfast.

Berkeley's R.C. FLYING SCALE
2" Scale — 68" Wingspan
$13.95
NAVION "Super 260"
For .29 to .35 Engines Radio Control
For .23 to .29 Engines Free-Flight
For .29 to .65 Engines Controline
This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Controline Flying. Thrill to its flashing performance and smooth response. As a free-flight, it will give you experience and confidence in low wing designs. Big, roomy, and well engineered, it will set the pace wherever it's flown. Easy to build!
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For .18 to .23 Engines—71" Span—3" Scale
"PIPER CUB J-3"
The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about. This is a rugged, detailed, flight proven design. Full-Size Plan with R.C. installations, Authentic Decals, etc
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Army Liaison YL-24
"HELIOPLANE"
Variable Camber Wing for Two-Speed Radio Control Flying
For .049 to .14 Engines — 39" Wingspan — 1" Scale
The "Helioplane" is the first model that permits the use of scale wing flaps. Depress 10 degrees for free flight; 25 degrees for slow speed control by radio; or raise wing flaps 5 degrees for high speed flight!
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For .35 to .32 Engines — 72" Span — 3" Scale
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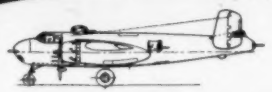

With twin engines screaming, the B-25 roars across the field. In 100 feet it's airborne and the gear retracts. With lessened drag and increased speed, it's responsive to every control. Who can tell it from its prototype as throttled down, it settles in for a power on landing, flaps down, gear down and locked. Individually shock mounted gears flex upward and rearward on impact. Gun the engines now and off you go again. Perfect for the Navy Carrier event, this detailed scale replica is easily assembled from this masterful kit.

Controline

$4.95

For .19 to .33 Engines

31" Wingspan

(U.S. Navy Designation SNJ-5)

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For Free Flight "½A" Flying Scale—Rubber— or Controline

$2.95

The "Buhl Pup" has been immortalized as one of the finest light planes ever designed. A number of full scale "Buhl Pups" are being rebuilt by "old timers". This truly different design makes an exceptionally realistic and fine flying model.

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1 1/16" Scale — 37 1/2" Wingspan

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For "½A" Engines

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1" Scale — 33 1/2" Wingspan

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For two .045 to .099 Engines plus Jetex 100, 200 or Jetmaster 150 unit, for exact scale power.

This is the ultimate in scale model controliners. Power it with two gas engines up to .099, and a Jetex Jetmaster "150" as a "Stinger" in the tail for extra high speed boost, just like the real "Savage". Kit

$9.95

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1 1/16" = 1' Scale — 31 1/2" Long

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For .45 to 1.20 Engines — 114" Wingspan 19½ Feet!

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Radio Control — Free-Flight

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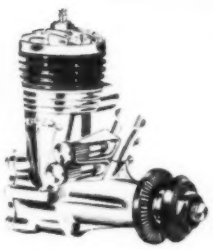
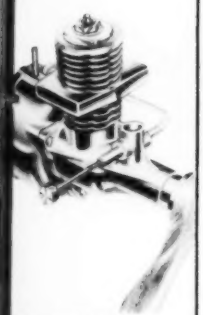
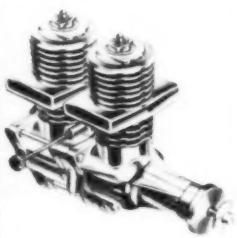


Torpedo 2 Speed
.19 - $16.95
Also available in
.15 - $11.95



Sky Fury Single
.049 - $4.95



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a Fury Outboard Twin
- $14.95 .15 - $16.95
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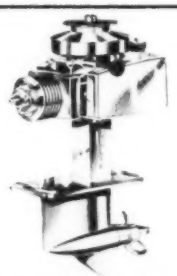

Sea Fury Inboard Single
.049 - $9.95
Also available in Twin
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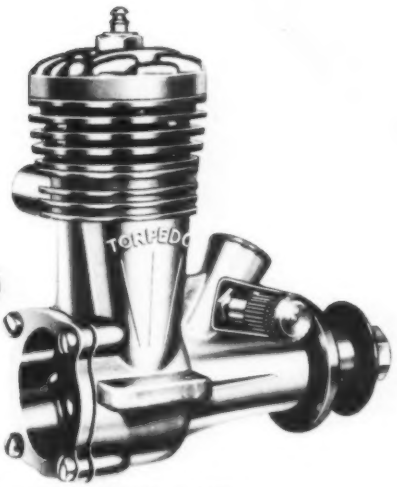
F.A.I. RECORD HOLDER *the* TORPEDO .29R

$15.95



Yes, the new Torpedo .29R racing engine is already a "Star Performer." One of the prototype models of the Torpedo .29R was entered in the F.A.I. Speed Trials, by Bill Wisniewski, the popular speed flyer from Lakewood, California. He established, and now holds, the International Speed Record of 142.2 M.P.H. The Torpedo .29R follows the same basic design as the world famous Torpedo .15, .19, .23, and .35.

This new Torpedo .29R is particularly adaptable to Team Racing, U Control Speed and Combat Flying. It is in addition to our present Torpedo .29 green head model that has been so popular for the past nine years. The Torpedo .29R has the same mounting dimensions as the Torpedo .35.

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"Micro-Five" slug pistons—*"McCoy's Military Secret"*—in McCoy Super Stunt engines are machined and microfinished to tolerances of 5 millionths of an inch—in both concentricity and size. This assures perfect fit of every McCoy piston and sleeve, interchangeability of parts, and minimum break-in. New fuel flow system gives 17-inch fuel draw for smooth, even running during stunt or combat maneuvers.

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Microfinished to extremely close tolerance, the "Micro-Five" piston assures easy starts and long fuel draw. These *Super Stunts* run like jack rabbits with their new pistons; and they feature famous McCoy power, ruggedness and dependability for stunt, free flight, combat and team racing. See the *Super Stunts* perform on the flying field. Then ask your dealer to show you the new McCoy *Super Stunt "19"* with "Micro-Five" slug piston.

You're flying high when it's McCoy powered!

If you fly in the ½A class, you're ready for a larger engine . . . make it a McCoy Super Stunt. And if you want to fly ½A, you'll get the same easy starting, dependability and traditional McCoy power in the sensational new McCoy .049 Glo engine.

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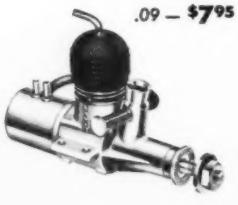

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only $16.95